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THE PHOTO-MINIATURE

: A MONTHLY MAGAZINE OF : PHOTOGRAPHIC INFORMATION

WHO DISCOVERED PHOTOGRAPHY?



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VOLUME V



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THOMAS WEDGWOOD. *1771+1805 From a chalk drawing, artist unknown

EXAMPLES EARLIEST THREE THE



Made from the earliest negative on glass, 1839 HERSCHEL



The earliest silver print on paper 1836 TALBOT



The first photographic reproduc-tion on metal of a line en-graving; about 1824 NIEPCE

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Volume V

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Number 60

WHO DISCOVERED PHOTOGRAPHY?

"What do you look on as the greatest boon that has been conferred on the poorer classes in later years?" said a friend to me one day, after expatiating on the rival claims of schools, museums, shoe-black brigades, and a host of other philanthropic efforts for their assistance. I am afraid I sank in his estimation when I answered, "sixpenny photographs." But any one who knows what the worth of family affection is among the lower classes, and who has seen the array of little portraits stuck over a laborer's fireplace, still gathering together into one the "home" that life is always part-ing—the boy that has "gone to Canada," the girl "out at service," the little one with the golden hair that sleeps under the daisies, the old grandfather in the country—will perhaps feel with me that in counteracting the tendencies, social and industrial, which every day are sapping the healthier family affections, the sixpenny photograph is doing more for the poor than all the philanthropists in the world."

These are the words of John Richard Green, the historian, who was also for many years a hardworking clergyman in the very poor district on the east side of London; and they have a force of vital truth that will

find a responsive echo in every heart.

But they touch upon only one of the multifarious uses now made of photography,—only one of the thousand ways in which its influence is felt as an aid to research, to study, to the diffusion of knowledge of every sort and kind, in the life of the world today. And

what its future shall be, who can say? The imagination

fails, overwhelmed by the possibilities.

And yet this discovery—one of the bright achievements of the nineteenth century,—dates only from the earlier years of that century in experimental origin,—only from the later two-thirds in practical realization.

It cannot fail to interest the leisure or benefit the studious hours of the present-day votaries of the "Light-Science" to follow, so far as we may, the groping steps, the baffled search of the men who strove with the problem; some dying by the way, some living to reap the honors and to see the world in homage ere they fell on sleep.

So believing, let us set forth the facts, in the spirit of this series, without prejudice or bias, and as briefly yet

comprehensively as may be.

The Forerunners of the Art bred, for the Greek philosophers had their theories of light and its phenomena. The other side has more than a tinge—a strong strain—of Gypsy blood, through the alchemists of medieval days; and Imagination must have been at least a god-motherly relation, if not the actual nurse of the infant prodigy.

The qualities of mirrors have always been recognized as due to the action of light. It was the function of Imagination to supply the idea of some substance that, when used as a mirror, would retain the image, or when applied to an ordinary reflecting surface would

fix it thereon.

Thus, there is to be found in Chinese tradition, we are told, the legend of the sun sometimes making on the frozen surfaces of lakes or placid rivers the images

of trees and other objects along their banks.

Even in our day, one may read from time to time, in his newspaper, some allusion to the popular belief in the mysterious qualities of the human eye, which is credited with the power of retaining on its inner surface, in cases of sudden and violent death, the picture on which it last rested, so that a murderer might, for instance, thereby be recognized and brought to justice; or of the lightning flash, that is said to impress on the skin of its human victims the silhouette of the trees under which they had sought shelter.

Fénélon and Tiphaigne

The French Bishop Fénélon wrote in 1690 "Une Voyage Supposé," wherein occurs this passage: "There was no painter in that country; but if one wished to have the portrait of a friend, of a picture, a beautiful landscape, or any other object, water was placed in great basins of gold and silver, and the object desired to be painted was put in front of that water. After a while, the water solidified and became a glass mirror, on which an

ineffaceable image remained."

A little more than half a century later, 1760, another Frenchman, Tiphaigne de la Roche, who may be called the Jules Verne of his day, issued a book with the title of "Giphantie — A Description of the Earth," which was a pseudo-scientific account of his adventures in an unknown country, to which he had been transported by an obliging hurricane. The language borrowed largely from the jargon of the alchemists, the scientists of their day, and the ideas are naturally influenced by the same source. The title is an anagram of the author's first name. His conceptions of the possibilities along this line happen to have a strangely prophetic sound, viewed in the light of events, though this should not be considered as anything more than a coincidence.

The passage which interests us is translated below: Having been one day transported into the palace of the elementary spirits, its guardian, enlightening him as to their occupations and customs, says: "You know that the rays of light, when reflected from any objects, form a picture delineating these objects, on all lustrous surfaces, such as the retina of the eye, water and mirrors. These fleeting images the Spirits have sought to fix. They have compounded a subtle viscous substance which quickly dries and becomes hard. By the aid of this, a picture is made in a few moments. We coat a piece of canvas with this substance, and place it in front of the objects which we wish to depict. At first the canvas acts just as a mirror would; you can see in it

all objects, near and remote, which Light has the power to portray. But the canvas does what no mirror is able to do,-it holds the image fast, through its adhesive The mirror, indeed, faithfully depicts properties. the objects, but retains none of them; our canvas depicts them no less correctly, but retains them all. The impression of the image takes place in the first instant, the canvas at once absorbing it. They then take it away, into a dark place. In an hour the coating has dried, and we have a picture which is all the more wonderful because no art can equal its verisimilitude, and the lapse of time is powerless to harm it. We use colors made from the purest sources, from the materials of which Light is itself made, while painters have to rely on all sorts of substances, which time never leaves unaltered. Exactness of drawing, diversity of characterization, heaviness or lightness of brush strokes, the transformation in the shadows, the correctness of perspective, -all these we leave entirely to Nature, which paints the pictures on our canvas with such uniformity and accuracy as to deceive the eyes, and cause the reason to doubt whether so-called realities are not some kind of phantom illusions, cheating eye, ear, touch,in short, all the senses at once."

A Period of Research and chemistry. It is significant that the epoch which produced this book inaugurated a period of activity and interest in both optics and chemistry. In the next year (1763) was published a work on "The Philosophical Commerce of Arts," by Dr. William Lewis, M.D., F.R.S., giving the author's investigations into the cause of the coloration of ivory, bone, wood or stone treated with a solution of silver nitrate and exposed to sunlight "; in 1772, Dr. Joseph Priestly issued his valuable "History of Discoveries Relating to Light, Vision and Colour," and in 1777 appeared the "Experiments on Air and Fire," by Carl William Scheele. Following him, Senebier, Berthollet,

^{*}This phenomenon, which had been observed by several earlier workers, was first correctly attributed to the action of light by Johann Heinrich Schulze, who published, in 1727, his conclusions, based on experiments with chalk, mixed with the silver salt. For details regarding these early notices of silver salt, see Major-General Waterhouse's article in The Photographic Journal for June, 1903.



J. NICEPHORE NIEPCE. *1765+1833
The accepted portrait, but entirely imaginary



NIÉPCE'S APPARATUS, IN THE CHALON MUSEUM Photograph by George E. Brown, 1903

Mrs. Fulhame and Dr. Black also contributed to the data of the subject, before the new century dawned; in 1800, Herschel, and in 1801, Ritter, investigating the spectrum, discovered, respectively, the ultra-red and the ultra-violet rays; the latter being demonstrated by means of silver chloride which darkened under their action.

This rapid survey of the field brings us down to 1802

and to

WEDGWOOD

Who almost discovered photography

Born on the 14th of May, 1771, the fourth son of Josiah Wedgwood, the famous potter, received the baptismal name of Thomas, though we are told by his latest biographer that he was known always, both in and out of the family, as "Tom," and if we permit ourselves, following his example, this familiarity, it is because it makes the man seem a little less remote—a little easier of comprehension.

The only portrait extant is that reproduced, the original being in the possession of the family, the artist unknown. The existence of a death-mask suggests that the portrait is of a posthumous date. It shows a clear-cut profile, a face of breeding, of distinction, although rather more mature than one would expect from the early age at which he died—in his thirty-fifth year.

His health was always delicate; indeed, the three years, 1789-1791, following his stay at Edinburgh University were the only working years of his life during which he followed any definite occupation. His early studies were carried on mainly at home. His father's secretary, Alexander Chisolm, had much influence on his book-learning; and the society of his father's friends, among whom were the foremost men of the day, was in itself a liberal education.

Tom Wedgwood's older sister was the wife of Robert Darwin, and consequently daughter-in-law of Dr. Erasmus Darwin, the poet. Charles Darwin, the naturalist, son of Robert, was thus a nephew of Tom Wedgwood. James Watt and Dr. Priestly were intimate friends of his father; he met Robert Burns while

at college, and in later years he became the friend and benefactor of Samuel Taylor Coleridge, the poet.

After leaving college, the laboratory and furnaces at his father's pottery gave him special facilities for experiments bearing on the relations between light and heat, and he gave much attention to them at this time, but there is nothing on record to show that he also then took up the chemical side of the subject.

Influence of Earlier
Experimenters

Dr. W. Lewis, the author of the book of 1763, and had compiled the manuscript volumes containing the records of his own and other experiments; which records died in 1781; at which time Chisolm was taken into the Wedgwood household and business.

And, as we have seen, Dr. Priestly, the author of 1772, was a friend of the family, and he corresponded

with its various members.

The date of the photographic experiments is doubtless some time during the year 1802. The account of them is printed in the first volume of the "Journal of the Royal Institution," and their form is attributed to Humphrey Davy, then a young man of twenty-three, who was assistant lecturer in the Institution, and assistant editor of the Journal. It is very probable that the experiments were made in the laboratory of the Institution, the building still standing on Albemarle street, London.

The paper is entitled "An Account of a Method of Copying Paintings upon Glass, and of Making Profiles, by the Agency of Light upon Nitrate of Silver. Invented by T. Wedgwood, Esq. With observa-

tions by H. Davy."

What Wedgwood Sought It has been a matter of common knowledge to mankind in all ages that there are many substances which alter in some way or other by exposure to sunlight. The bleaching of linen is a familiar example—the fading of posters on the bill-boards

is another. But these changes are slow and gradual. In order to realize in any degree the dream of Giphantie, some more sensitive substance must be produced, ere photography began to be a possibility. Such a substance, one that will alter under the influence of light, is alone not enough; we need also some means of separating the part which has altered from the part which has not. If we cannot accomplish this, the "fixing" of the image, the light will go on acting on the portions of the sensitive material on which little or no light has fallen, and the result will be that the whole will eventually be affected in the same way-will become totally darkened.

The investigations of Schulze and his successors had indicated two sensitive materials,—the nitrate and the chloride of silver; the optical work of Priestly and Herschel, among others, had suggested the employment of the lens and the prism. It remained to combine these factors; that was what Wedgwood and Davy did.

His method was to soak paper or Wedgwood's white leather in a solution of silver Method nitrate and to expose this sensitized material under a fern or an engraving. Just as in the first Talbot process of a third of a century later, and analogous processes available and used to some extent today, the result was the darkening of the unprotected sensitized surface of the contact prints. The first requisite of a photographic process had been supplied. But the second was not forthcoming. Davy was compelled to admit that "nothing but a method of preventing the unshaded parts of the delineations from being colored by exposure to the day is wanting, to render the process as useful as it is elegant."

The images formed by a camera-obscura were among the first to be experimented with by Wedgwood, but he found them "too faint to produce in any moderate time an effect upon the nitrate of silver." The images formed by the solar microscope were found to work better, and seem to have been experimented with

chiefly by Davy.

It has been claimed that a French savant named Charles had reached results similar to Wedgwood's at an earlier date; but this claim rests on no evidence, and

may be dismissed without further consideration.

Whether or not the pessimistic conclusions of Davy acted as a damper on the enthusiasm of other would-be investigators is a matter of speculation. At all events, no one is on record as having taken the matter up for a generation, when, as we shall see, another Englishman repeated his experiments and extended them in a successful manner.

Meantime, in one of the central provinces of France, appeared a student of the black-and-white art of sunpainting, who, working along wholly different lines, met with such a degree of success as to give him the fame of being one of the discoverers of photography.

NIÉPCE

And the first permanent photographic record

Joseph Nicéphore Niépce was a man over forty-five at the time he took up the researches which ultimately led him to his comparatively successful results. Born at Châlon, on the Saône, March 7, 1765, his father was able to rear him and his brother Claude in a careful and thorough way. The brothers had an abbé for tutor, who instructed them in science, languages and literature. For the first, they both had a special bent, the results of which were shown in after life. In 1792, Nicéphore joined the army, served in Italy, was made lieutenant, but within two years was obliged by a severe illness to relinquish his military career, and resigned his commission.

In 1811, Claude left Châlon, hoping to succeed in promoting at Paris a machine called the "Pyrelophore," for propelling boats without sails or oars (by the use of hot air), on the construction of which the brothers had collaborated for several years and secured a patent. Unsuccessful in this aim, he went on to England shortly afterward, and settled at Kew, near London. It is mainly from the letters that passed between them that we learn of Nicéphore's earlier essays, for he kept up

a frequent correspondence.



STATUE OF NIEPCE, CHALON-SUR-MARNE Erected 1885 Photograph by George E. Brown, 1903





NIEPCE'S HOUSE AT GRAS GRAVE OF NIEPCE NEAR GRAS Photograph by George E. Brown, 1903



L. J. M. DAGUERRE. *1787+1851
From a daguerreotype by Charles Meade, 1848 (usually erroneously ascribed to Mayall)



MONUMENT TO DAGUERRE, WASHINGTON, D. C. Erected by The Photographers' Association of America, 1890

He was living the life of a quiet country gentleman, on the parental es-Niépce's First tate at Gras, not far from Châlon. After Essays his brother's departure he turned his attention to lithography, then in its infancy. His son Isidore fixes the date as 1813. He at first attempted to substitute for the usual lithographic stone the product of a local quarry. Finding this unsuitable, he next tried polished metal plates, probably pewter. His object being to reproduce various line-engravings, he sought to do away with the labor of re-drawing them by oiling or varnishing them, to secure transparency, placing them upon the metal plates, previously coated with various substances and exposing the whole to the action of light.

What these first coating substances were we have no His son, Isidore, writing twenty-five years afterward, referred to them as "varnishes"; but the probability is that his recollections were not clear,

being confused with the later essays.

At all events, Niépce met with enough Niépce Uses success to encourage him in persevering; the Camera he had recourse to the camera, as shown by a letter to his brother written in May, 1818. letter alludes to the use of paper, to receive the image, to "fixing the colors," and to the fact that the highlights came out black, the shadows white. On May 28, 1816, he sent to Claude four metallic plates which bore impressions made by light, on what substance is not stated. In 1817, he tried chloride of silver, and also phosphorous, and guiacum, among other resins.

In 1826, we find him settled on one of these resins, the "bitumen of Judea," a kind of asphaltum, spread on polished metal plates. When exposed under one of his transparent engravings, this substance suffered a change in those parts on which light had acted most strongly; a change which became evident by their resistance to the solvent power of essence of lavender,a menstruum in which the unchanged bitumen, which the opaque parts of the engraving had protected, was still soluble.

It is worthy of notice that this process really gives a "negative" image, so far as the lights and shadows go; the high-lights of the copied engraving were represented by the dark brown asphaltum coating, the blacks

by the polished surface of the metal.

Niépce had accomplished his object; he had found a way to make engravings draw themselves in outline, not only in their actual size (by contact), but also in smaller and proportionate dimensions, by use of the camera. This, however, required such long exposures, at least ten hours in direct sunshine, and the asphaltum was so little sensitive that the practical value was very slight.

As shown by his letters, he experimented with direct exposures on natural objects, as well as on engravings. But these produced only silhouettes, without detail,—

white shadows against a dark sky.

Having secured a delineation of the The First Enengraving on his metal surface, the graved Plates problem at once arose as to how to carry it further and get the relief necessary to make the new plate printable. Niépce tried various metals as a support for his coating of asphaltum; among them, silver. We can readily imagine that he also tried the effect as a mordant of every substance he could think of that might etch away the unprotected metal part of his "heliographs," for so he had named them; a very appropriate title, for "sun-drawings" exactly described them. He used iodine, among other things, with no success, at least as a mordant; it produced a slight effect in altering the color of the metallic surfaces, however. But that was not what Niépce sought. He also used acids, and by their aid succeeded in etching away the surface of the metal support in those parts protected by the asphaltum.

Herein lies Niépce's achievement; for this is the germ of modern photo-engraving processes in relief on metal. Those who have studied the methods used by photo-engravers in the manufacture of half-tone blocks will see that Niépce's process is identical in principle with the bitumen process in use at the present day, and it is not surprising to find that Niépce used it as a means of etching his metal plates. He soaked the exposed plate in oil of lavender, thus removing the solu-

ble asphaltum, and then placed it in an acid bath by which the bare metal was etched. No action of the acid took place where the asphaltum intervened, and thus he obtained a plate in slight relief, which he inked and took proofs from in a press.

Relics of Niépee An engraved plate said to have been produced in this way by Niépee in 1826, the original engraved print, from which it was made by contact, still oiled to render it transparent, and proofs from the plate itself, are preserved in the Museum at Châlon. A reproduction from one of these proofs (in reduced size) is shown in our frontispiece. Another illustration shows the apparatus he used.

In August, 1827, Nicéphore made a journey to England to see his brother Claude, who was seriously ill at Kew. During his sojourn there of several weeks, Nicéphore made the acquaintance of Francis Bauer, who undertook to lay the results of Niépce's experiments before the Royal Society, of which he was at the time secretary. Niépce wrote a memoir, and it was offered to the society, accompanied by a framed picture on metal, and some proofs from engraved plates.

The memoir was not accepted by the Society, because the process was not fully disclosed. Returning to France in the following January, both memoir and specimens were left by Niépce with Mr. Bauer, and

now form part of a private collection.

Niepce and Daguerre

Niepce and Daguerre

It is interesting to note the allusion made in the course of the memoir to a suggestion offered him by "M. Daguerre, the painter of the Diorama of Paris." This related to the use of glass instead of metal for the support; etching the bared surfaces; dissolving off the unaltered asphalt; filling the etched parts with lithographic ink, and finally backing up the glass with white paper.

Daguerre had heard of Niépce's experiments, and wrote to him in January, 1826. Niépce was at first shy, but at length took up the correspondence in a guarded way, so that by April, 1827, they had exchanged specimens, and Niépce proposed an exchange of secrets.

The opportunity came when Niépce passed through Paris on his journey to Kew; he met Daguerre, at several long interviews. The next summer Daguerre went to visit Niépce at Châlon, and in December, 1829, was executed a partnership agreement between them, to continue for ten years, for working out their researches to their joint advantage.

Niépce made no advance of importance on his original process up to the time of his death, which occurred

July 5, 1833, in his sixty-ninth year.

As in the case of Wedgwood, there is no authentic portrait of Niépce. A portrait bust and the painting from which our plate was made exist; but they, as well as all other likenesses extant, are based on a profile in outline sketched from memory by his son Isidore, and first published in *La Lumiére*, a French photographic journal, in the issue dated July 6, 1851. The type of face is very like that of Wedgwood.

Niépce First
Fixed the
Image

Image

The summing up of Niépce's achievements must credit him with the first
"fixing of the image" in a way strangely
suggestive of development; though not
strictly such, because of a physical, not a chemical nature. By his asphaltum method he thus obtained the
first direct photographic records that had any claim to
relative permanency; and the first indirect results, by
photo-engraving,—possibly the most important phase of

Niépce's memory is honored by a portrait statue in one of the squares of Châlon. He was buried on the estate at Gras, where a modest stone marks his grave,

alongside that of his wife.

the subject, in its present-day aspect.

DAGUERRE

and the Daguerreotype

We have seen that the name of Daguerre, "the eminent painter of the Diorama," was one which carried enough weight to make it worth while quoting to the Royal Society; who, then, was Daguerre?

He was certainly in the public eye, for the Diorama



INTERIOR OF CHURCH, BRY-SUR-MARNE
The "chancel" effect, behind the altar, is a painting effected by Daguerre
Photograph by George E. Brown, 1903



WILLIAM HENRY FOX-TALBOT. *1800+1877 From a photograph by Moffat, Edinburgh

was one of the sights of Paris from 1822 to the destruction by fire, March 3, 1839, of the building specially constructed for the display of its panoramic paintings,

the work of Daguerre and his partner Bouton.

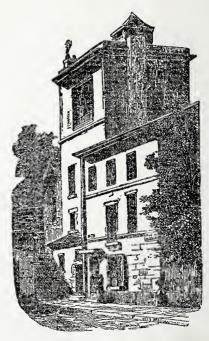
Louis Jacques Mandé Daguerre first saw the light on the 18th of November, 1787, in the village of Cormeilles, about ten miles from Paris. When he was five years old his parents moved to Orleans; he left there when sixteen, to begin life for himself in Paris; at fifty-five he retired to Petit Bry-sur-Marne—another near-by village-and there died in 1851-July 10. The father was crier of the local court at Cormeilles, the mother from one of the village families. In the troublous times of the Revolutionary epoch, the father lost his position, which was the occasion of the removal to Orleans. Daguerre, the son, grew up lustily. He had such schooling as the public school offered; showed an early aptitude for drawing, and is said to have produced creditable portraits of his parents when thirteen. father, therefore, placed him in the office of an architect, where he became "very good at tracing." The career did not attract him, however; and in 1803, again with the advice and assistance of his father, we find him going to Paris to enter the employ of Degotti, a flourishing scene-painter.

This suited his temperament; he made good progress, developing dexterity, a sense of decorative effect and ready invention, which he applied to the improvement of stage "effects," and his work was an important part of several notable pieces put on at the principal theaters.

He assisted Pièrre Prevost on his

Daguerre's Diorama Panoramic paintings of London, Rome, Naples, Athens and Jerusalem, which were brought out between 1816 and 1821; and from this experience got the idea of the Diorama, which he put into execution in connection with Bouton in 1823. The building, made from Daguerre's plans, was circular; the platform for spectators in the center turned on a pivot, so as to bring the pictures successively to view. In 1830, Daguerre introduced his "Diorama with double effect"—painted on both the front and back surfaces of a thin canvas, and lighted at the back and top.

With top light alone the picture on the front face was brought out; as the rear illumination was gradually brought into play, the second design began to show; and the top light being then slowly cut off, the details



House in which Daguerre lived, 15 Rue de Marais, Paris

of the first design became obscure. This was very successful for showing interiors, with day-and-night scenes, and other similar subjects—which are matters of every-day stage effect now, but were a novelty then.

Daguerre also painted easel pictures, which were hung at the various exhibitions. He seems to have taken up the idea of fixing the camera-obscura picture

in 1824. As we have seen, he wrote to Niépce in January, 1826, and showed him his results in August. Niépce's description of Daguerre's methods alludes to the "chemical composition" as a "very fine powder which does not adhere to the surface, and must therefore be kept horizontal," and guesses at its analogy with sulphate of barvta (which possesses fluorescent properties).

The acquirement by Daguerre of the details of Niépce's process, after the partnership had been signed, started him working with a sort of fury. We can imagine him, repeating the experiments, with his superior lenses and other facilities, and trying to improve

upon the original results.

It is said of him, by a friend, that he Tireless shut himself up in his laboratory in the Experiments Diorama building "and for nearly two years lived almost continuously in the midst of books, crucibles, retorts and melting-pots.'

As a matter of fact, he made some modifications in Niépce's process, one being the substitution for asphaltum of the residuum left when oil of lavender is evaporated: the other, the method of development by placing the plate face downward above a dish containing the

solvent, which was gently heated.

After the death of Niépce, if not earlier, Daguerre abandoned the experiments along Niépce's lines, and struck out resolutely along his own. After two years, in 1835, he announced to Isidore Niépce, who had succeeded to his father's interests in the partnership, his dawning success; and after two more years, devoted to perfecting details, in 1837, made with him a supplementary agreement under date of June 13, couched in the following terms: "I, the undersigned, hereby declare that M. L. J. M. Daguerre, painter, member of the Legion of Honor, has communicated to me a process of which he is the inventor. This new method has the advantage of reproducing objects with sixty to eighty times the rapidity of that invented by M. J. N. Niépce, my father. As a result of this communication. M. Daguerre consents to turn over to the partnership the new process of which he is the inventor, and which

he has improved, on condition that this new process

shall bear the name of Daguerre only."

In 1838, they attempted to float a company which should buy out the process, and a subscription was opened from March 15 to April 15, the valuation being put at 200,000 francs; but no one came forward to invest, and other means were resorted to. Daguerre decided to appeal to the government, and succeeded in interesting Arago, the noted astronomer and scientist, who warmly took up the cause, and laid the matter before the home minister, to whom Arago's endorsement was enough, and who offered life-pensions to the two partners, in exchange for their secrets. The project was successfully carried out; the pensions,-6,000 fr. to Daguerre, 4,000 to Niépce,-were decreed on June 15, 1839, and the details of the processes, before secret, were laid before the Academy of Sciences on August 19, by Arago; the new art being christened "the Daguerreotype.

Morse and Daguerre hat Morse, who was then in Paris, showed Daguerre his own infant invention and visited his laboratory and

saw his results in the fall of 1838.

Daguerre had placed a written account of his process in the hands of Arago in January, 1839, and publicly showed specimens of the results which he had obtained. Articles appeared in the newspapers of the time, under date of January 7 and 14, though no details were given.

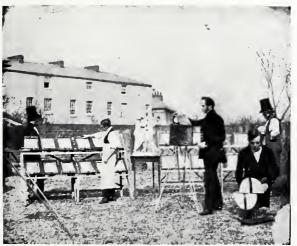
The daguerreotype, the first successful photographic

process, was a reality!

Daguerre's process is based on the use of a highly polished surface of metallic silver, which has been exposed to the vapors of iodine. An extremely thin film of iodide of silver is formed on the plate, in this operation, and the pure white luster of the silver gives place to a dull surface at first of a primrose-yellow color, then taking deeper shades.

The iodized plate is exposed in a camera, but no image can be seen upon it until the developer is ap-



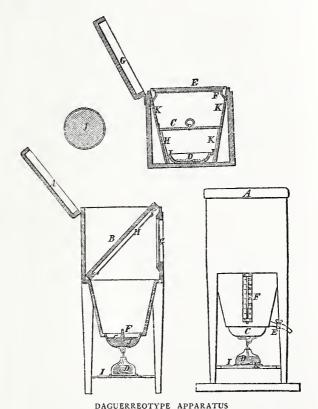


TALBOT'S STUDIO AND CALOTYPE PRINTING OUTFIT AT READING From contemporary calotypes





LACOCK ABBEY AND CHURCH
The residence and burial place of Talbot. The chancel of the church
was recently restored as a memorial
Photographs by Mrs. Catharine Weed Ward



lodizing box (above) in section. Mercurizing box (below) in section and elevation

plied. This developer is a strange one - the vapor of mercury, often called quicksilver. After removal from the camera, the plate is placed face downward in the upper part of a light-tight box, in the lower part of which the mercury vapor was generated by heating the liquid metal slightly by a spirit lamp.

The remarkable result is thus described by Arago: "The mercury de-Development by Mercury posits itself plentifully on those parts of the surface which have been exposed to bright light, but does not adhere to the unexposed parts, whilst to the portions which represent the half-tones it affixes itself in greater or less quantity, proportional to the action of the light upon these parts. By the light of a candle the operator can follow step by step the gradual formation of the image. The mercury vapor can be seen to trace the details of the image as though it were a brush of exquisite delicacy." The image once developed in this way, the plate was fixed in a solution of chloride or of hyposulphite of soda, rinsed and dried.

The daguerreotype is ofted alluded to as a positive on metal, but this is incorrect; it is really a negative image, in optical contact with a mirror-like metallic surface—which seemingly renders light and shade in their right relations, but cannot remedy the inverted drawing, which gives right for left and left for right (unless prisms or other reflectors are employed).

We note that Daguerre made use of metal plates, silvered; Niépce had also used them. We find that he used iodine; Niépce also tried it, but only as a color-

ing agent.

Nièpce's image was not visible after exposure, until acted upon by the solvent liquid, the fixing agent; Daguerre's image required a developer, the mercury vapor, to cause it to appear, and was subsequently "fixed" in a solution of common salt. Had Nièpce never experimented, or had Daguerre never learned of Nièpce's methods, doubtless the daguerreotype would never have been invented.

What Daguerre Did fication for denying any credit to Daguerre,—a most unfair conclusion.
What, then, did Daguerre discover—and how?

He found the chemical relations of substances where Niépce had caught only their physical relations. His sensitive substance was chemically formed, chemically altered by light, chemically developed and chemically

fixed. Above all, he made a workable process -- the first workable process, and on lines all his own. fact that his name will always be linked with it ought, however, to offset the efforts of all his detractors.

Tradition avers that Daguerre's mercury development was an accidential discovery. Having removed some partially exposed plates from the camera, he stored them, we are told, in a closet containing various chemicals; and was amazed at finding, the next day, that they bore a fully developed image. By submitting the contents of the cupboard to a rigorous series of tests, he traced the results to an open flask of mercury.

If true, so much the more credit to Daguerre's observation and acumen; for it is a strange thing that no man, even today, is able to explain just why the mercury attaches itself to the exposed iodide, and not

to the unexposed iodide.

There exist many contemporary portraits of Da-The one which we reproduce is from a daguerreotype usually credited to Mayall, but undoubtedly made by Charles Meade, of New York, during a visit which he paid to Bry, in 1848, the story of which has been told elsewhere.

Daguerre, soon after obtaining his pension, retired to Bry-sur-Marne, where he ended his days and

lies buried in the local cemetery.

The visitor can still see an example of his skill in the little church of Bry-sur-Marne. Daguerre introduced behind the altar a huge canvas, on which he painted a view of the interior of the nave of a church. The effect has been stated to be so realistic that a person standing before the altar might suppose himself in the center of the church, but on visiting the church one finds the painting of the nave strongly lighted by a window hidden from the spectator. The result would not deceive the senses for a moment; the color of the painted nave jars with the somber gray of the church. and its lighting is theatrical. It looks what it is - a clever piece of painted scenery.

^{*}See American Annual of Photography, 1891, 1893.

TALBOT

Photogenic Drawings and Calotype

In the year that Niépce died, there came to a young Englishman sojourning at Lake Como, in Italy, the idea of fixing in some way the images of the camera. The next year, 1834, he began experimenting, along the lines of Wedgwood, with paper coated with silver salts. In 1835, when Daguerre's process was beginning to take its definite shape, "new attempts to obtain pictures of buildings with the camera-obscura were made." During the following three years, "not much was added to previous knowledge." In January, 1839, "an event occurred . . . which frustrated my hope . . . of being the first to announce to the world the existence of the new art." The event alluded to was the announcement of Daguerre's discovery.

These quotations are from Fox-Talbot's preface to The Pencil of Nature, published in 1844-5, and serve

to show his own estimate of his own priority.

William Henry Fox-Talbot was a country gentleman living in an ancient residence—Lacock Abbey in Wiltshire, which his family had inhabited since the sixteenth century. He received the usual education of a gentleman's son (Harrow, Cambridge, college prizes, Twelfth Wrangler, second Chancellor's Medallist and Porson prizeman). For two years he was a member of the House of Commons, but in 1828 he settled down at Lacock and devoted himself to scientific pursuits. He was then eight-and-twenty years of age, for he was born in the year 1800. The portrait on another page shows him as he appeared in later life, and two views are also given of his photographic printing establishment.

On January 25, 1839 (nearly three weeks after the announcement of Daguerre's success), Professor Faraday showed some of Talbot's "Photogenic Drawings" to the members of the Royal Institution of London. January 31, Talbot read a paper before the Royal Society, which was published in the *Philosophical Magazine* for March, 1839, with details of his methods, which is

too long to quote in full.

Wedgwood's Experiments Followed on their results in two particulars; he obtained greater sensitiveness, by coating his paper first with a solution of common salt, then with a nitrate of silver, thus producing silver chloride within the fibers of the paper, in the presence of an excess of the nitrate; and he used, with partial success, potassium iodide and also salt solution as fixing agents.

Talbot's first process—the "Photogenic Drawing"—was thus what we call a "printing-out" process for producing silhouettes by contact in the same manner that Wedgwood had done—or in the camera, which Wedgwood did not do, although he recognized the

possibility.

The print of a fern, shown in the frontispiece, was made by Talbot, it is claimed, in 1836, the original

being still in the possession of his son.

In February, 1841, Talbot patented the "Calotype" process, afterward called "Talbotype." In this process he used gallic acid or tincture of galls, for two purposes. He added it to the solutions used to prepare the paper, in order to render the latter more sensitive. and he employed it as the developer of an invisible im-Talbot would seem to have taken a hint from Daguerre as to the possibility of exposing for a short time only and of completing the process by development. This application of the development principle to his process was an immense advantage, and the calotype paper could be made rapid enough for landscape and portrait photography. The negatives were printed on his original "photogenic" paper, and the whole process was such that in 1844 Talbot issued the book of actual photographic views, entitled The Pencil of Nature. In the following year he published a collection of twentythree views under the title "Sun Pictures in Scotland."

Talbot was an indefatigable patentee. He patented the waxing of paper prints to make them more transparent; he patented the use of a colored backing paper to improve the appearance of transparent prints; he patented a hot solution of hypo for fixing; and he actually patented the publication of photographic prints. He did not patent a photographic technical journal, proof perhaps of his financial sagacity!

READE and Gallic Acid

The Rev. J. B. Reade was a scientific man of repute, and a fellow of the Royal Society. The sole documentary ground for assigning him a share in the discovery of photography is the following letter from him to E. W. Brayley, the librarian of the London Institution, where Reade had delivered a discourse on his invention.

I. B. READE TO E. W. BRAYLEY, ESQ.

March 9, 1839.

"The most important process, and one probably different from any hitherto employed, consists in washing good writing paper with a strong solution of nitrate of silver, containing not less than eight grains to every dram of distilled water. The paper thus prepared is placed in the dark and allowed to dry gradually. When perfectly dry and just before it is used, I wash it with an infusion of galls prepared according to the Pharmacopœia, and immediately, even while it is yet wet, throw upon it the image of microscopic objects by

means of the solar microscope.

"It will be unnecessary for me to describe the effect, as I am able to illustrate it by drawings thus produced. I will only add, with respect to the time, that the drawing of the flea was perfected in less than five minutes, and the section of cane and the spiral vessels of the stalk of common rhubarb in about eight or ten minutes. These drawings were fixed by hyposulphite of soda. They may also be fixed by immersing them for a few minutes in salt and water, and then for the same time in a weak solution of hydriodate of potash. The drawing of the Trientalis Europea was fixed by the latter method; it was produced in half a minute, and the difference in the color of the ground is due to this rapid and more powerful action of the solar rays. This paper may be successfully used in the camera-obscura."

From this it is seen that Reade did Reade's invent a print-out process very like that **Process** of Talbot's of February 21, 1839-close upon one another's heels, these inventors-with the advantage of "hypo" for fixing. But he did not, as has been argued by Mr. Werge in his Evolution of Photography, discover the development of the latent image. In 1854, both Talbot and Reade appeared in court in the course of an action brought by Talbot against one Laroche, and in the course of examination Reade himself states the extent of his discovery very plainly.

He "washed paper with a solution of common salt, then with nitrate of silver, and he placed it before the solar microscope to receive the picture, and he washed it with an infusion of galls, and proceeded to take the picture. He found it necessary to keep the paper wet, and in order to see how the picture was being developed, though he had no idea of an absolutely invisible image, but in order to strengthen the image which had been produced, he put his head in the microscope and watched how the picture was being developed, and when it had come to a certain tone of blackness which he termed solar-mezzotinto, he suspended the operation and fixed by hyposulphite of soda. He had on one occasion been called away, and at that time a piece of paper had been only a short space of time under the action of light, but when he came back he found an image on it. This, however, did not give him the idea of a latent image, and he had not the slightest notion of it until he learned it from Mr. Talbot." [Report of the case in The Photographic Journal, December 21,1854.]

HERSCHEL

Fixing with "Hypo" and other Researches

On March 14, that is, about three weeks after the reading of Talbot's paper, a note was read-also to the Royal Society-by Sir John Herschel. In this short paper, Herschel described a process almost identical with Talbot's, except in one very important particular, -that was the method of fixing. Herschel made use of hyposulphite of soda—now known universally as hypofor giving permanence to the prints. The hypo dissolved the unaltered silver salt, but left that portion which had darkened unaffected. It appears that Herschel was unaware when he began his experiments of what Talbot had been doing, and was led to investigate and to make known his results by the extraordinary interest taken in the announcement of Daguerre's

discovery.

John Frederick William Herschel was born in 1792. His father wanted him to enter the Church, but his natural inclinations and brilliant career at college marked him out for a scientific career. Physics and chemistry were his favorite studies, and he would have done much more work in them had he not considered it a filial duty to continue the astronomical labors of his father. Sir William was the founder of sidereal astronomy. As one of his biographers said, "he organized the science and set it going; he laid down the principles for its future action; he accumulated materials for its generalization and gave examples of how best to use them." So until 1838 Sir John devoted himself to completing his father's observations in all parts of the globe and afterward to publishing the collected material. But he constantly swerved into mathematics, physics and chemistry, for science then had not become so specialized but that one man could follow more than one branch of it. Moreover, Herschel was no dryas-dust philosopher. Like Davy, he was a poet and had a poet's sympathetic nature. His books for the non-scientific person gained him a wide circle of readers and great popularity as an interpreter of scientific discovery.

The first scientific paper of Herschel's which possesses photographic interest was written some twenty years before that pregnant period when he, Talbot and Daguerre gave separately to the world distinct photographic processes. It is entitled "On the Hyposulphurous Acid and its Compounds," and was communicated to the Edinburgh Philosophical Journal in 1819. In this paper are described the properties and preparations of what Herschel called hyposulphurous acid and

of its salts. Photographers may perhaps conclude that the use of the word "hyposulphite" here is authority for the retention of a term which has frequently been explained to be a misnomer, now that subsequent research has brought to light a compound H₂SO₂, which is the body to which this name must be applied. Herschel's hyposulphurous acid has been shown to be sulphuric acid with one of its atoms of oxygen replaced by It is therefore rightly called thiosulphuric acid -"thio" denoting replacement of oxygen by sulphur. The real sodium hyposulphite, it may be mentioned, is a developer of the latent image.

Herschel's paper on his "hyposul-The Theory of phites" would have little interest were not the solvent action of these salts on the silver haloids (i. e., in silver bromide, chloride and iodide) therein described. But this is done very precisely. He says:-"Muriate of silver, newly precipitated, dissolves in this salt, when in a somewhat concentrated solution, in large quantity and almost as

readily as sugar in water."

But what is more interesting still is that he goes on to describe the different "hyposulphites" of silver produced, according to whether the hyposulphite or the silver salt is in excess. In the one case, a clear solution is obtained containing soluble hyposulphite, in the other an unstable salt is thrown down, which rapidly changes in color from white to black and eventually subsides as a black precipitate. And so Herschel, it is seen, pointed out, what photographers have been particularly blind to for many years past,—that they must use a considerable excess of fixing salt to convert the silver bromide or chloride into soluble hyposulphite. He also showed that the latter reaction—excess of silver salt on hyposulphite-constituted a most delicate test for this substance; so delicate that he calculated he could detect one part of hyposulphite in 97,800 parts of water.

In this same paper a curious fact is mentioned, which may perhaps be unknown to many photographers who have made daily use of sodium thiosulphate for years It is that the solution loses its disagreeable past.

metallic taste when silver chloride dissolves in it, and

becomes intensely sweet.

The news of what Daguerre had succeeded in doing was the gossip of Europe, even before the method employed by him was described by Arago on August 19, 1839. Herschel naturally heard of it and immediately turned his attention to the solution of the same problem. On what date he succeeded cannot be stated, but he read the paper, as previously mentioned, before the Royal Society on March 4, 1839. As this paper is short, we may quote it fully from the Royal Society Proceedings.

"Note on the Art of Photography, or the Application of the Chemical Rays of Light to the Purposes of Pictorial Representation," by Sir John F. W. Herschel,

Bart.

The author states that his attention was first called to the subject of M. Daguerre's concealed photographic process by a note from Captain Beaufort dated the 22d of January last, at which time he was ignorant that it had been considered by Mr. Talbot or by any one in this country. As an enigma to be solved, a variety of processes at once presented themselves, of which the most promising are the following: (1) The so-called deoxidizing power of the chemical rays in their action on recently precipitated chloride of silver; (2) the instant and copious precipitation of a mixture of a solution of muriate of platina and lime-water by solar light, forming an insoluble compound which might afterward be blackened by a variety of agents; (3) the reduction of gold in contact with deoxidizing agents, and (4) the decomposition of an argentic compound soluble in water, exposed to light in an atmosphere of peroxide of chloride, either pure or diluted.

Confining his attention, in the present notice, to the employment of chloride of silver, the author inquires into the methods by which the blackened traces can be preserved, which may be effected, he observes, by the application of any liquid capable of dissolving and washing off the unchanged chloride but of leaving the reduced, or oxide of silver, untouched. These conditions are best fulfilled by the liquid hyposulphites.

Pure water will fix the photograph by washing out the nitrate of silver, but the tint of the picture resulting is brick-red; the black color may be restored by washing it with a weak solution of hyposulphite of ammonia.

Herschel's Researches

of light, but an accidental observation led him to the discovery of other salts of silver in which the acid, being more volatile, adheres to the base by a weak affinity, and which impart much greater sensibility to the paper to which they are applied, such as the carbonate, nitrate and the acetate. The nitrate requires to be perfectly neutral, for the least excess of acid lowers in a remarkable degree its susceptibility.

In the application of photographic processes to the copying of engravings or drawings, many precautions and minute attentions to a number of apparently trivial but really important circumstances are required to ensure success. In the first transfer, both light and shadow, as well as right and left, are the reverse of the original, and to operate a second transfer or by a double inversion to reproduce the original effect, is a matter of infinitely greater difficulty, and in which the author has only recently ascertained the cause of former

failures and the remedy to be applied.

"Twenty-three specimens of photographs made by Sir John Herschel accompany this paper; one a sketch of his telescope at Slough, fixed from its image by a lens;* the rest copies of engravings and drawings, some reversed or first transfers, and others, second

transfers or re-reversed pictures.'

Sir John Herschel followed up these photographic experiments with some persistence; he did not publish anything further till February 20, 1840, when he read a long paper to the Royal Society "On the Chemical Action of the Solar Spectrum on Preparations of Silver and other Substances, both Metallic and Non-metallic, and on Some Photographic Processes." In this we find him longing for nomenclature and accordingly describing a picture in which the lights and shades are as

^{*}See frontispiece.

in nature as a "positive" and one in which they are reversed as a "negative," terms which have endured and are in use to this day.

Other Experiments of mercuric chloride on a print. He was searching for different fixing agents, and does not appear to have linked the bleaching action of the mercuric salt with that of others, such as copper and ferric chlorides. But he explains how to revive the bleached image by a solution of sodium thiosulphate, and points out that the process furnishes a means of painting in mezzotint (i. e., of commencing on black paper and working in the lights), as also of secret

writing and a variety of similar applications.

The way in which Herschel was led to take the first photographs on glass comes out in the course of this paper. He was experimenting with a view to finding to what extent organic matter was indispensable to the rapid discoloration of silver compounds, and therefore naturally sought to support his sensitive salt on glass. He did this by mixing extremely weak solutions of salt and silver nitrate in a deep vessel, at the bottom of which lay (horizontally) a clean glass plate. many days the supernatant liquid was syphoned off, the last portions were withdrawn by a syphon of hemp-fiber and the glass allowed to dry. It was found that a film of pure silver chloride was left on the glass, which, when moistened with silver nitrate, showed very considerable sensitiveness to light. The real importance of the experiment—that of mounting the sensitive material on glass-does not appear to have occurred to Herschel, who concluded, "This mode of coating the glass with film of precipitated argentine or other compounds affords, it may be observed, the only effectual means of studying their habitudes on exposure to light, free from the powerful and every-varying influence of the 'size' in paper. "

In the concluding parts of this paper, Herschel occupies himself with the action of the different parts of the solar spectrum on silver salts and on natural coloring matters. He had encountered the phenomenon over which the earliest experimenters spent so much labo-

rious investigation with so little result; viz., the curious coincidence between the color of the light-affected salt and that of the part of the spectrum coloring it. fact, which has been the inspiration of much work for the realization of a perfect process of direct heliochromy, had been noted by others, including Daguerre.

In a paper read before the Royal The Iron Society on June 16, 1842, while he again Salts says much of the action of the spectrum on coloring matters which appears today to possess but little interest, he adds some most important notes on some metallic compounds which he has found "photographically impressible." He found that ferro-sesquicyanuret of potassium, a compound just then newly prepared by Gmelin, which is familiar to every photographer today as potassium ferricyanide, became sensitive to light when spread upon paper, and after long exposure gave an image in Prussian blue. Then he found that when the ferricyanide solution contained an iron salt the decomposition took place much more rapidly, because, as he noted, the latter combination was sensitive to the whole spectrum, whilst the ferricyanide alone showed sensitiveness only in the blue and violet portions. He used as ferric salt, first ferric chloride and then ferric ammonium citrate. The latter gave him a mixture which, applied to paper, gave positive prints in Prussian blue. Then he separated the two materials, and found that a paper coated with ferric ammonium citrate owes its sensitiveness to light to the deoxidation (reduction) of the ferric salt to the ferrous state. This he ascertained by using as a test for ferrous salt a solution of chloride of gold, which he knew would be reduced to the metallic state by it. The result of this test led him to devise the process which he named Chrysotype, the similarity of which to the modern platinotype is very close in theory, however far away it may be in practice.

Herschel did an immense amount of work on the photo-chemical decomposition of these iron and cyanogen compounds, and the student of the subject will find his original memoirs full of suggestions for new

processes.

Thus, he experimented much with mercuric salts in devising a process for using them in his cyanotype process. He discovered that an ordinary blue print placed in a solution of mercurous nitrate is gradually bleached. The paper having been dried, the picture can be restored by passing a smooth hot iron over it when it reappears, not blue but brown, but soon fades out.

Herschel's experiments in direct heli-Spectrum ochromy, to which reference has been Work made, showed that when a bright spectrum was thrown upon paper coated with chloride of silver, various colors were produced. This had been done before by Seebeck of Jena, but, according to Hunt, Herschel succeeded in obtaining colors that very closely approximated to those of the spectrum itself. He found that when washed in water some degree of permanence was obtained, and, also, that the colors deepened on the paper being kept for some days in the dark. His work was followed by that of Hunt, Becquerel and others, but it cannot be said that at the present time much has been added to our knowledge of this subject.

To summarize: Herschel gave us thiosulphate fixation. He independently discovered a process almost exactly similar to that devised by Talbot some five years previously. He was the first to use the terms "positive" and "negative," and to obtain a negative on glass.

It is interesting to note that Herschel's experiments referred to on p. 562, under the second heading, dealing with the platinum salt, is in a sense the forerunner of the platinotype process, today so widespread and popular for the more artistic sorts of renderings of photographic subjects. The "blue-prints" that have played such an important rôle in the present-day development of all the vast industrial enterprises that involve mechanical and engineering drawings, enabling hosts of duplicates to be placed in the hands of workmen, superintendents and the like, are also the direct result of his investigations of the iron salts.

His career is thus a most instructive example of the world-wide benefits that a veritable man of science can

confer on humanity and progress.

SYNOPSIS

Niépce	Daguerre	Talbot	Reade and Herschel
1814 Com- mences ex- periments. 1826 Photo- engraved plates pro- duced.	1824 Com- mences ex- periments.		
1833 (July 5) Death.	1835 Process communi- cated to I s i d o r e Niépce. 1839 (June 7) Process an- nounced.	1834 Com- mences ex- periments. 1835 Perma- nent prints and camera image ob- tained.	
	1839 (August 19) Process published.	1839 (Feb. 21) Pro- cess pub- lished. 1841 Calo- type process published.	1839 (March 9) Reade's process. 1839 (March 14) Her- schel's pro- cess.

With this synopsis before us, let us pause for a moment at the point we have reached—the year 1843. Looking backward over the brief history of photography, we see the tedious labors of Niépce, laying in reality the foundations of modern "process," but contributing to the perfection of Daguerre's process. We see daguerreotypy brought to its perfection in 1839. Of Talbot's work we see the practical conclusion in the calotype process. Slow, expensive and cumbrous were both these systems of photography. Those who at that date took the same glance back could never have imagined the tremendous developments awaiting their rudimentary methods. It will give greater clearness to our conception of how photography has progressed from these small beginnings if in imagination we traverse the ground again. We shall set the pace of time as though we had Mr. Wells' "time machine," and we shall shut our eyes to the endless by-ways from the main road. When first presented to the photographic inquirer, they seemed of promise, but in our hypothetical view of all the way from then to now,

they become insignificant.

We shall find one characteristic of photographic history very useful to us, and that is the almost invariable custom of each pioneer to take something already in practice and base something different of his own on to Daguerre used iodine, as also did Niépce; Talbot employs the hyposulphite prescribed by Herschel. Even so, each new process has something in common with that which preceded it, and in perishing gives some portion of itself to its successor. Of daguerreotypy we see no more for the moment. It is a separate unit surviving its author but a few years, and has not yet, like calotype, proved the germ of other The first step from Talbot's process on processes. paper was taken by Niépce de St. Victor (a cousin of Nicéphore Niépce). He used glass plates on which to take his negatives, and consequently had to find some substance by aid of which to hold his silver and other chemicals on the plate. He used albumen and starch, mixed with an iodide, sensitizing with silver nitrate, exposing the iodide thus produced, developing and fixing with potassium bromide. This in 1847. In the next year the stream of progress doubles on itself, for Blanquart-Evrard introduced albumen on paper, thus giving us the albumen paper still familiar.

The Collodion Process a solution of gun-cotton in alcohol and ether. His was henceforth known as the wet collodion process. The drawback of wetness of the plate at the time of exposure led to a modification of wet collodion in two

directions. First a word on Archer's process, practically the wet collodion of today. To a solution of nitrated cotton in alcohol and ether some iodide and bromide is added, and this "iodized collodion" poured over the plate. As soon as set, the plate is treated in the "silver bath" (silver nitrate) and a deposit of silver jodide and bromide of extreme fineness formed in the pores of the collodion. There is silver nitrate, too, and so the plates cannot be kept, for this salt as well as the alkaline nitrates would crystallize out on the film. If the plate is to be used dry, some substance must be added to prevent these salts from crystallizing. One variant on the wet collodion process was based on this fact. Albumen, honey and other substances were used in this "dry plate bath" process, according to the prescriptions of Taupenot, and others, about 1855, and from that date many other "preservatives" (pyrogallic acid, sugar, beer, etc.) were used.

The other modifications of Archer's Collodion process sprang from a desire to dispense Emulsion with the uncertain "silver bath." Could not the silver be combined with the collodion? Sayce and W. B. Bolton, in 1864, prepared this "emulsion," consisting of silver bromide or iodide in a fine state of suspension. Collodion emulsion progress has lasted until now. First came the washing of the soluble nitrates from the emulsion, after coating; then washing of the emulsion in bulk, and, more recently,

the color-sensitizing of emulsion.

The next advance is linked with col-Gelatinolodion emulsion. In 1871, Dr. Maddox Bromide substituted aqueous gelatine solution for the spirituous collodion and found the same a possible photographic preparation. This "gelatino-bromide process "-so momentous in the history of photography -was worked out by Burgess, Kennett and Wratten, to name only three of the investigators, and Kennett, about 1874-1877, put gelatine plates upon the market. Of the further history of gelatine emulsion little need be said. The reader knows of its adaptation to paper, transparencies, and to the production of plates of extreme sensitiveness.

Orthochromatism
matters (when added to collodion emulsion) for the green, yellow and red parts of the spectrum. This discovery of orthochromatism—its value slowly appreciated by photographers—led to tone-correct photography and to the present-day processes of color reproduction.

Acknowledgment

The basis of this monograph was a lantern lecture, with illustrations, by Mr. George E. Brown. The sections relating to Wedgwood, Niépce, Daguerre and Talbot and the chronology have been expanded and largely rewritten by Mr. C. W. Canfield. To record the whole story of progress in the many branches of photography would fill many a volume of THE PHOTO-MINIATURE; let us be content with setting down here some of the chief dates.

A Chronology of Some Original Observations of Photographic Processes and Agents

SILVER SALTS

Silver Nitrate

- 1647. Sola, Angelus. Opera Medico Chymica. "Powdered lunar caustic, exposed to sunlight, blackens."
- 1658. Glauber. Opera Chymica. For staining woods, dyeing feathers, etc., black.
- 1727. Schulze, J. H. Acta, Cesarean Academy. Change due to light, proved by using stencils.
- 1763. Lewis, Dr. W. Philos. Commerce of Arts Change favored by presence of organic matter.
- 1777. Scheele, Carl Wm. Aeris atque Ignis. Change by reflected light also.
- 1794. Fulhame, Mrs. An Essay on Combustion. Presence of water necessary.
- 1802. Wedgwood and Davy. Jour. Royal Soc. Vol. I. Exposure to camera and solar microscope. Contact prints on paper and leather.

Silver Chloride

1757. Beccara, J. B. Comm. Acad. Bolognese, Vol. IV. Color changes due to light.

1777. Scheele, Carl Wm. Aeris atque Ignis.
Change due to reduction of metallic silver; more rapid under violet rays.

1796. Black, Dr. Joseph. Lectures on Chemistry.

Presence of water necessary.

1801. Ritter, J. W. Changes in invisible (ultra-violet) rays.

1802. Wedgwood and Davy. (See under Nitrate).

1836. Talbot, Fox.
With excess of nitrate.

1840. Claudet. Chlorine on metallic silver (Daguerreotype).

Iodide of Silver

1837. Daguerre, L. J. M. Iodine vapor on silver plate (Daguerreotype).

Bromide of Silver

1840. Goddard.
Bromine on metallic silver (Daguerreotype).

Iron Salts

1842. Herschel, John Ferro-prussiate paper.

1844. Hunt, Robert. Oxalate (ferrous).

1845. Herschel, John Protosulphate, persulphate, Tartrate, Ammonio-citrate. Herschel.

Potassium Salts

1838. Ponton, M. Bichromate.

1844. Hunt, Robert. Cyanide.

Resins

1782. Senebier, Jean. Memoirs.
Bleaching and darkening of wood due to oxidation of resins.

1803. Wollaston. Guaiacum.

1814. Niépce, N. Asphaltum (Heliography).

1830. Daguerre, L. J. M. Resin of oil of lavender (Heliography).

1855. Macpherson
Asphaltum—in photo-lithography.

Fixing Agents

1814. Niépce, N.
Oil of lavender with petroleum (for asphaltum).

1819. Herschel, John. Hyposulphite of soda (properties observed).

1836. Talbot. Sodium chloride, potassium iodide.

1839. Herschel, John. Hyposulphite of soda (applied).

Collodion

1851. Archer, F. Scott. Wet-plate process.

1855. Taupenot, J. M. Dry-plate (collodio-albumen process).

1856. Fothergill. Dry-plate process.

1857. Hill-Norris dry-plate.

1864. Sayce, B. J. Collodio-bromide emulsion.

1865. Simpson, G. Wharton. Collodio-chloride emulsion.

Gelatine Emulsion

1866. Palmer and Smith. Gelatino-chloride.

1871. Maddox, Dr. R. L. Gelatino-bromide. 1874. Kennett. Gelatino-bromide as dry Pellicle, and coated plates.

Photo-Lithography

1853. Barreswill and Davanne.

1855. Poitevin (Bichromated colloid).

1869. Albert (Albertype).

1869. Osborne.

1870. Obernetter.

Photogravure

1852. Talbot

1866. Woodbury, W. B. (Woodburytype, Stannotype).

1881. Klic (Klic-Talbot). With carbon film.

Photo-Engraving

1881. Meisenbach (screen process).

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Of other works narrating the history of photography, the following are the most important:

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Geschichte de Photographie. By C. Schiendl. (Hartleben, Leipsic.) The most complete and accurate account of photographic progress.

La Vérité sur l'Invention de la Photographie. By Victor Fouqué. (Published at Chalon, 1867.)

Memoires Originaux des Créateurs de la Photographie. Edited by R. Colson. (Paris, Carré & Nand, 1898.)

La Découverte de la Photographie in 1839. By Mentienne. Paris, 1892.

The Photogram, 1900, published an exhaustive account of the shares of Talbot, Niépce, Daguerre, Herschel and Reade in the invention of Photography.

Potes

With this number THE PHOTO-MINIATURE completes its fifth year. The Title Page and Contents Index for Volume V are included in this issue and should not be overlooked by those who bind or

preserve the magazine for reference.

The success of the magazine makes possible several desirable improvements in its character and make-up. The significance of these will appear in our April number, now preparing for press. Briefly: the number of pages will be largely increased; a more readable type-face will be used for the text pages; a new cover design will replace that now in use, and the number of illustrations in each issue will be increased. There are other desirable improvements, but these present difficulties and must announce themselves as they appear. The broad purpose of all the changes proposed is to widen and increase the scope and usefulness of the magazine.

The April number will deal with the camera, its parts, appurtenances, varieties and uses,—a timely little book which should be useful to many during the next few months. Forthcoming numbers will deal with lenses, exposure shutters, printing papers, methods of control in printing, vacation work, pictorial composi-

tion and similar popular topics.

Up to the present time all the sixty numbers of THE PHOTO-MINIATURE thus far published have been kept in print. Some of the earlier numbers, however, are hardly up-to-date in their information, and these we propose to retire, thus giving opportunity for the publication of new numbers dealing with the same subjects with additional and revised information, wholly rewritten and illustrated. Numbers 1, 3 and 11 are retired according to this plan and will not be reprinted. The few copies of these issues on hand will be reserved for

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those who are completing their sets of THE PHOTO-MINIATURE series. Early application should be made for them, as the number of copies remaining unsold is exceedingly limited. Trade orders for Numbers 1, 3 and 11 can no longer be supplied.

A

Cramer Iso Plates Ahead.—Mr. André Callier, in the January issue of the Bulletin Belge, publishes the results of a series of experiments made by himself to determine the comparative color-sensitiveness of twenty-five kinds of commercial orthochromatic plates. Those selected as the best were the "Percorto," "Perchromo" and "Eosinate" brands, made by Perutz, of Munich; Cramer's "Slow Iso," the "Color" plates of Westendorp and Wehner, Cologne; Lumiere's "Panchromatique," and the "Apollo" orthochromatique of Unger and Hoffman, Dresden.

The comparison with these highly esteemed European plates was very favorable to the Cramer Iso, showing a much higher sensitiveness in the yellow-green (D-E) of the spectrum, almost equaling, indeed, the theoretical limit, while not unfavorable in the blue and indigo

regions (F-G).

The observations were made by daylight, using a simple flint prism, and a Zeiss Protar lens, and have no pretensions to absolute precision. This does not, however, affect their value as a practical comparative test,

as the possible error is less than 2 per cent.

The results were plotted into curves by Eder's method (based on the logarithms of the opacities in the different spectrum-regions as ordinates, and the "Angstrom" units varying by two-thousandths, as abscissæ), which affords a ready means of graphic comparison with one another and with the theoretical curve given for the daylight spectrum itself.

Taken as a whole, the curve of the Cramer Slow Iso plate follows more nearly than any other the theoretical curve, in its general contours. Its consequent lesser rapidity is a consideration of minor importance, however, where the object in view is the maintenance of color-values. And it is to be further noted that the

quick-working orthochromatic plates require, in practice, the use of yellow-green color-screens to lessen their sensitiveness to blue-violet, which screens, of course, lessen their rapidity.

Moral: Cramer Isos are hard to beat.—C.

4

An important forthcoming exhibition is that announced for the month of October next, in Berlin. It is to be international in scope, and exhibits are solicited under four general classifications—Art, Scientific, Industrial and Applied Photography.

Particulars will be forwarded on application to Director Schulz-Henke, W. 30, Victoria Luiseplatz 6, Berlin, Germany. Applications must be made before

May 1.

4

The price-list of lenses, cameras, shutters, etc., recently put out by the C. P. Goerz Optical Works is a most sumptuous production, worthy a place in any photographic library. There are over 100 pages, size 7½ x 10 inches, with numerous attractive illustrations of work done with their apparatus, as well as representations thereof.

One feels the "embarrassment of choosing" between the fifty sizes and sorts of lenses available in the five series, ranging in power from the special rapid type, with an angular field of 65°, down to the freakish-looking "Hypergon," with a mount as large in circumference as the focal length of the tiny globular glasses that peep out from the center, and a record of 135° of angular definition.

Several valuable tables of value to lens-workers are

given in this connection.

The Goerz sector and focal plane shutters, the Goerz-Anschutz camera, Photo-Stereoscopic and Trieder Binoculars are fully described; and to close, an interesting account is given of the Goerz factory with numerous views therein, showing the various departments, and the progressive stages in the making of the lenses.

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Hand cameras for plates or films 4 x 5 or smaller, without tripods, may be used at the St. Louis Exposition without fee or charge. This information is official from John A. Wakefield, chief of the Department of

Concessions.

This very important concession has been secured largely through the efforts of the Eastman Kodak Co., and amateur photographers will appreciate the good work herein accomplished by the powerful aid of this firm. It is the first time that an Exposition management in this country has been broad and liberal-minded enough to take such a stand, which cannot but result in benefit to the Exposition by the widespread publicity given to its attractions through the thousands of handcamera prints which will be made and distributed during the year. The departure is worthy of our warmest commendation, and should be taken advantage of by all photographers.

We regret to learn that the March issue of the *Photo-Era* (Boston) was totally destroyed by a fire in the printing plant of that publication, which will delay its publication. The number will be promptly reprinted and mailed to subscribers at the earliest possible moment.

Books and Prints

Die Photographische Kunst im Jahre 1903. Ein Jahrbuch für Künstlerische Photographie. Edited by F. Matthies-Masuren. Halle, 1903; Wilhelm Knapp.

pp. vii + 164, $8\frac{1}{2}$ x 12.

The second yearly number of this handsome annual is most creditable to its editor, and to his collaborators and the contributing artists. The size and shape of the volume are such as to lead one to expect the dignified and fitting presentment of the subjects illustrated; and on this score there is no disappointment, for there are in all 110 illustrations, thirteen of which are full-page plates.

While the German workers are in greatest force, numerically,—nineteen all told—yet their total of forty-four prints, an average of two and a fraction, is excelled by the seven representatives of Austro-Hungary, credited with thirty-two subjects; a trifle over four

each, if averaged.

And it must be further admitted that these comprise a still larger proportion of the works that give a distinct "flavor" to the collection as a whole—being predominatingly landscapes of broad, though not freakish treatment.

The late H. Watzek, of Vienna, and H. Kühn, of Innsbrück, are credited with thirteen numbers, all but

one or two being landscapes of high quality.

Hardly to be distinguished from their work, and on the same high level, are similar subjects by Otto Ehrhardt, of Coswig, near Dresden, and A. Schneider, of Meissen.

In portraiture, again, the work of Dr. Fr. V. Spitzka, of Vienna, takes rank with that of Perscheid, of Leipzig, and Hugo Erfurth, of Dresden, though conceived in a quite different genre. But comparisons, whether personal or national, however well meant, are prover-

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bially unsatisfactory, and are as well left out of the case when, as here, there is such ample evidence of earnest effort and so high a degree of attainment, by all and several of the workers, united in their fealty to art, which is international, and in the larger sense im-

personal.

It is a matter of some surprise that the titles of the text-pictures are not given either underneath or in the index, while the separate plates have both entries. Furthermore, one cannot commend the facing of horizontal pictures toward the outer margin of left-hand pages, as on pp. 8, 94 and others; it only renders necessary an extra twist of the book, in examining it.

The half-tone blocks are well made and printed on heavy coated paper. Of real value are the dozen articles by the editor and other well-informed writers.—C.

.2

Practical Orthochromatic Photography; the Scientific Principles and Their Practical Application. By Arthur Payne, F. C. S. London: Iliffe & Sons. 1903. 178 pages; 53 illustrations. 50 cents.

This is No. 14 of the "Bookshelf" series issued by *Photography* at a popular price, and is certainly a good fifty cents' worth. The author is full of his subject,

and is evidently expert therein.

He considers it under the general heads of the action of colored light-rays—isolated components of white light—upon photographic plates; methods of correcting

such plates for color-value, and for luminosity.

It is to be regretted that he has not studied some one's handbook of the principles of literary luminosity, so as to be able to make his meaning, and the relevancy of one subject to another more easily obvious. For instance, instead of writing (p. 84), "The lantern is fixed at a height of about seven feet—measuring from the floor—above the sink," we think he would then have put it, "The lantern is fixed above the sink, at a height of about seven feet, measuring from the floor." As it is, the mere technical portions are rather hard reading.

The make-up of the book is also open to criticism,

in the matter of grouping the plates. Figures 1 to 4, each on a separate page, if so reduced as to go on a single page, or two opposite pages, would be much more instructive. Similarly, Figs. 30 and 31, and other pairs, would be much easier of comparison on opposite pages.—C.

Ą

Portraiture for Amateurs without a Studio. By Rev. F. C. Lambert, M.A. In two parts. London, 1903.

Pp. xxiii + 176. Ills. and diagrams.

The author has endeavored to guide the tyro into the paths of rightness by showing what, in his opinion, should not be done; and has been highly successful in enlisting martyrs to the cause who have sacrificed their vanity on the altar of friendship, and allowed themselves to be exhibited in the rôle of "horrible examples." The numerous illustrations are accompanied by full diagrams in explanation of the relation, in plan, between camera, sitter, window and reflector, in each case where necessary.

The book is well printed on good paper, and the text

is smoothly written, in untechnical language.

It is to be feared, however, that its net effect on the intelligent beginner will be to arouse in his mind the fixed determination to save the shillings that spoiled plates and other materials wanted in following these experiments would cost, to buy the best book that offers on "How to Build a Studio," and forthwith to set about the accomplishment of that end, before attempting portraiture.

Familiarity with ideal results and conditions is the most effective way of learning how to make the best of

untoward conditions, when these must be faced.

The two volumes form Nos. 27 and 28 of "The Amateur Photographer's Library."—C.

,4

Camera - Kunst; Eine Internationale Sommlung von Kunst - Photographien der Neuzeit (Camera-Art; an International Collection of Present - day Art-photographs). Edited by Ernst Juhl and Fritz Loescher.

58 I NOTES

Berlin. 1903. Gustav Schmidt, publisher. 8 x 10;

pp. 107-112; 18 plates, 64 text-illustrations.

This excellent work is in execution a good fulfilment of the promise of the title-provided one agrees with the standpoint of the editor, who seems to have felt that the art-status of a picture is fixed largely by the name and previous fame of its maker. The works he has selected have been chosen from those exhibited "in recent years" at Hamburg, London, Paris and Philadelphia. If he has stretched a point in any direction, it has been due to the worthy motive of patriotism, whereby a larger number of examples by German workers is included than the standard set by non-Germans would

strictly justify.

Outside of the portraits by Nicolas Perscheid, of Leipzig, which have a noteworthy strength and character, sufficient to warrant their appearance in any company, the German portrait work included in the collection falls indubitably short of distinction, while the landscapes chosen as representative of the national attainment are chiefly such as attempt to reflect the somber mystery of the Böcklin type or the panoramic presentment of the later and lightsomer school, just now in favor there. Both these styles are mannerisms of local and probably temporary vogue - and such absolute truth or reactionary virtue as they possess may not unwisely be considered as a bit too deep-lying for successful imitation by photography, even in its present advanced stage of development. Still, this is perhaps too broad a generalization as regards the entire fieldhowever justified by the examples here offered.

Besides the examples by fourteen German contributors, there appear twenty-two by sixteen British workers, twelve by four Americans (Stieglitz, Steichen, White and Käsebier), and thirteen by four representatives of France. Denmark, Russia and Belgium total six pictures by three representatives, one for each

nationality.

While the collection, as a whole, lacks freshness because of the inclusion of so many examples that have elsewhere appeared in the past, it has the merit of bringing these together in convenient form.

All the process-blocks have been newly made for this publication, and are well brought out on a not too

shiny paper.

Several text articles, with no special relation to the illustrations, are given from the pen of the editors, Ernst Juhl, Edward J. Steichen, Robert Demachy, Alfred Stieglitz and others.—C.

Ą

Die Bildnis - Photographie; Ein Wegweiser für Fachmänner und Liebhaber (Portrait - Photography; a guide for Professionals and Amateurs). By Fritz Loescher. Berlin: Gustav Schmidt. 7½ x 9½; pp. xii + 180.

The author is well aware of the futility of attempting to formulate specific rules or methods for the practice of the art he writes about, and hence his treatment is general. He covers in a score of pages the days of the daguerreotype, the wet plate, "retouching," the dry plate epoch, and gives a number of particularly atrocious studio portraits, to illustrate the faults of "professional" workers in respect to composition, accessories, etc. These pages are a foil and introduction to "the new portraiture" which is to revolutionize such matters and make Raphaels of the camera out of all its devotees!

Credit for the new order of things is properly given to the amateurs, as a class, rather than to the professionals; as was indeed perfectly natural and to be expected. Herr Loescher notes the success, however, of proselyte professionals, and professional amateurs, with the public that pays, and evidently expects that the force of example will bring all practitioners into line. That this would not be an unmixed blessing, his own book is a valuable object-lesson; for the succession of dark rectangular pictures, however interesting separately, imparts a distinctly somber cast to the book, as one leafs it through.

From this is to be drawn the conclusion that the presentation in the illustrations of so many subjects of such generally similar treatment has the force of precept—the ordinary man deduces the idea that by imitation of the dark background, the outré placing, the subdued effects,

he will attain merit through mystery.

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The moral, rather, should be that each worker best succeeds when he expresses himself, whether through canonical or heretical methods; by saying something worth saying, rather than acting as a human phonograph. Hence the value of principles-hence the success of artist-trained men and women, who are capable of picture-making "by hand," when they turn to photography as a "medium."

'You cannot make a silk purse' out of-totally for-

eign material.

Not as a manual, but as a pleasantly written and agreeably illustrated reference book, should this work be taken up; its dicta assimilated in the spirit in which they were penned.—C.

Dr. Hubert Jansen, editor-in-chief of the Technolexicon, referred to in a previous issue, sends the following short report on the work done up to February, 1904: The universal technical dictionary for translation purposes, in English, German and French, the compilation of which was begun in 1901 under the auspices of the Society of German Engineers, has received help up to the present time from 363 technical societies at home and abroad: 51 of these are English, American, South African, etc., 274 German, Austrian and German-Swiss, and 38 French, Belgian and French-Swiss societies. Of firms and individual collaborators, 2,573

have promised contributions.

The excerption of texts in one, two or three languages (handbooks, pamphlets, business letters, catalogues, price-lists, etc.) and of the existing dictionaries has yielded 1,920,000 word-cards so far. To these will be added within the next two years (by the middle of 1906) the hundred thousands of word-cards that will form the result of the original contributions-those already sent in and those still expected-of the 2,573 collaborators at home and abroad, when the editors in Berlin have finished them for the press. Specially made handy note-books had been placed at the disposal of the collaborators to write their collections in, of which 317 have come in filled so far.

All the outstanding contributions will be called in by Easter of this year, 1904. The collaborators are therefore requested to close their note-books or other contributions—unless a later term has been especially arranged with the editor-in-chief—by the end of March and to forward them to the address given below. As the printing of the Technolexicon is to begin in the middle of 1906, delayed contributions can be made use of in exceptional cases only up to that time.

The editor-in-chief will be pleased to give any further information wanted. Address: Technolexicon, Dr. Hubert Jansen, Berlin (NW. 7), Dorotheenstrasse 49.

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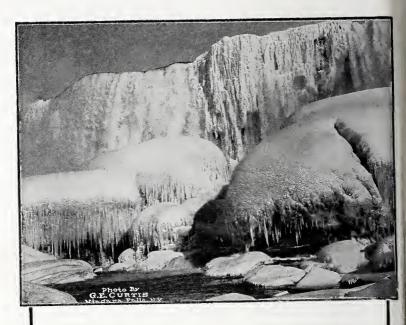
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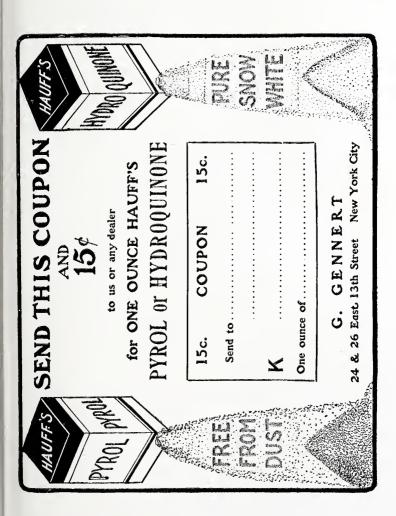
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The literary contents include a critique on the principal British exhibitions, and on the non-exhibited works, by A. C. R. Carter; a continuation of the "Hints to Would-be Picture Makers," by H. Snowden Ward; an Analytical Criticism of four of his own works, by Frederick H. Evans; and articles on the French School, by Robert Demachy; the German School, by Fritz Loescher; the American School, by Osborne I. Yellott and by Carl E. Ackerman; the Australian Work, by A. J. Hill-Griffith, etc.

To those who have not been able to visit the exhibitions it is indispensable, as form-

ing the only effective substitute.

To all interested in Pictorial Photography it is a highly interesting and educative volume, enabling the student to compare the different "schools" and exhibitions. Perhaps the most useful of all its functions is the introduction of new work by unknown workers, and this has been done more largely in 1903 than in any former year.

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Gentlemen: I presume, from my experience of your materials, that you have received so many voluntary testimonials that one more or less does not signify. I feel bound, however, to testify as to the excellence of your goods under rather trying conditions. In March, 1903, I sailed from Halifax, Nova Scotia, in an eighty-ton schooner bound for Panta Arenas (Sandy Point), practically the extremity of South America. Previous to leaving Halifax, I purchased one of your No. 3 Kodaks and several dozen rolls of films, also a developing machine (Style E) and necessary chemicals as prepared by your firm. Although I had often watched my brother, who is a clever amateur photographer, I had previously had no actual experience of photography. However, I read your books carefully and am pleased to say that I went ahead correctly from the start. I took many photographs during our journey down south, both at sea and at different ports of call. We spent four months cruising round Tierra del Fuego and amongst the innumerable islands to the south of Magellan Strait, and I was fortunate enough to obtain a splendid collection of photographs of all kinds-Indians, guanaco, seals,

ROCHESTER, N. Y.

glaciers, mountain scenery, etc. I was at first somewhat chary of getting your developing machine, but, after a pretty exhaustive test, I have no hesitation in stating that it is a splendid

invention and especially suited for travelers.

The only films I was able to obtain at the time (in Halifax, February, 1903) which were prepared for use in the developing machine were marked, "To be developed before August I, 1903." I can only say that after twice crossing the Equator and experiencing many changes of climate I successfully developed some of those same films in England, in December, 1903. I am indeed extremely pleased with your No. 3 camera and developing machine, and consider the two as the best combination that could be adopted by any explorer or traveler, or any one for the matter of that.

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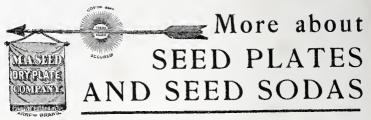
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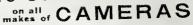
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- Modern Lenses, April, 1899
 The Pose in Portraiture
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- 4. Photography Outdoors
 5. Stereoscopic Photography
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- 10. The "Blue Print," etc.
- 11. Developers and Development 12. Retouching Negatives and Prints
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- 31. Photographing at Night
- 32. Defects in Negatives
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RAIN FROM THE HILLS
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The Photo-Miniature

A Magazine of Photographic Information

Volume V

FEBRUARY, 1904

Number 59

COMBINATION PRINTING IN PICTORIAL PHOTOGRAPHY

It is no part of this number of THE PHOTO-MINIA-TURE to discuss the legitimacy of combining two or more negatives to produce a single print; but years ago, in my own practice, I felt the desire to do so, and after endeavoring to follow the directions published by the late H. P. Robinson, and miserably failing, I had to work out a way of my own. Moreover, Mr. Robinson's methods originated in the days of silver printing, a method giving a visible image after exposure, in which process his earlier works were produced before platinotype was invented or carbon printing became general; and, although I believe this veteran pictorialist was able to adapt himself and his methods to printing processes in which the image is not visible during printing, I have heard of very few, if of any one, able to follow his lead with any measure of success.

During the past two or three years I have lectured before photographic societies in many of the chief cities of Great Britain, including the London Camera Club, showing my audience how I find it easiest to print a portion of one negative into the print of another, and have been surprised to find what keen interest was shown in these demonstrations. Furthermore, no articles that I have written have brought me so many communications asking for further particulars as those in which I have attempted briefly to describe these same

methods of combination printing.

Articles contributed to a photographic journal, however, have been too limited in space to admit of one's fully describing details, hence I am glad to have the present opportunity of treating the matter more fully, and so have something to which to refer

my numerous inquirers.

Perhaps I ought to warn my readers at the outset that I have no new inven-Explanation tion to communicate, no newly discovered process to divulge, but shall merely describe certain applications of simple methods which were born of my own necessity, and their efficacy attested by the fact that several of the best-known English pictorial photographers have since adopted them with success. Moreover, let it be understood that I have been commissioned to describe, and have no wish on the present occasion to appear as advocating, a method which it is possible, even in these days of emancipation from academic standards and rules, may seem to be inappropriate in connection with photography, which probably in the first instance owed its popularity to its fidelity to fact more than to anything else. It must be obvious that the photograph which consists of the part of one negative, and the whole or part of another, can no longer pretend to be a faithful record, but at once becomes a creation, and is artificial as distinguished from natural. Whether it is also artistic depends entirely upon the manner in which it is done.

A picture made after this manner is The Part first a creation of the imagination, be-Played by cause before ever we deliberately intro-Imagination duce into one scene some part of another we shall have imagined the thing done, and have seen in thought the combined work completed. But remember, a truly imaginative work is always so like to what nature might be as to appear as if gathered direct from nature, and when carried out, must, therefore, never give so much as a suggestion of its artificial character. If sane, we shall never conceive the idea of printing a boat from one negative into the middle of the grass field of another. Why? Because it would be unnatural. In like manner we will not desire to introduce a group of

cattle from one plate into the landscape of another in such a way as to show joins and overlapping edges, because such blemishes do not appear in nature, and will betray, at a glance, the fictitious nature of the work: and while it may be possible to set forth a means whereby the combination of several negatives in one print may be achieved without such tell-tale errors, there are other ways in which the disclosure may be made, and so render the picture artistically impossible. For instance, the scale as to size, the tone,—that is, the lightness and darkness in relation to other parts,—and the direction of illumination of the components, must be in absolute agreement, else the result becomes ridiculous to any one whose perceptions are keen enough to detect the error, and yet it were not difficult for the photographer to commit such faults. That knowledge of nature which is born of close and persistent observation is instinctively acquired by the artist during the long period occupied in mastering the technicalities of his process, as compared with which the photographer's process is so nearly automatic, and his technique readymade, that he sets out to practice with the disadvantage of being unprepared.

Some Difficulties ponent parts might conceivably be arrived at by calculation and be made true in perspective and appear as if true to fact; also the concurrence of the lighting of each part might, but to a less satisfactory degree, be arrived at by intelligent consideration; but accuracy of relative tone is a more subtle matter and can only be discerned by an intimate acquaintance with the facts of nature derived from careful observation.

The combination printer discards that assurance of truth which the very mechanical character of the photographic process gives him, and must rely entirely on his own knowledge and judgment to avoid drifting into error,—errors which it will be more difficult for him to detect than for others, because the very fact of the picture being his own offspring blinds him to some extent to its shortcomings.

The elementary principle of aërial perspective is, of

course, that the darkest shadow and highest light shall be in the nearest plane; the other shadows and lights each becoming respectively dark and light in an inverse ratio to their remoteness. But complications occur in the translation of colors into monochrome, even without which it were difficult enough to add a distance to a middle distance of just such depth of tone as shall make

it seem to assume its proper place.

Enough has been said for the present to place the impetuous student on his guard against the pitfalls which his own want of knowledge of nature may provide for him. The objections raised by those who argue that the photograph, pictorial or otherwise, should be the direct and untampered-with product of the normal process, only raise their protest when these methods have been clumsily or ignorantly employed, and have thus betrayed themselves. Whatever the auxiliary means employed, whether chemical or mechanical, no exception can be taken thereto if their presence cannot be detected; they should, indeed, serve to make the representation more ideally natural, so true as to be more natural than a copy of nature, giving no excuse for suspicion, the end thus justifying the means employed.

Printing-in Clouds

The simplest form of combination printing is that in which clouds from one negative are printed with the landscape of another, and this has been so generally practiced without any special appliances, merely covering the one portion of the paper whilst the other is being printed, that it may hardly seem necessary to refer to it, but that one so often sees this printing-in of clouds done badly, either through reprehensible carelessness, lack of power of perceiving that the result is bad, or more especially, want of knowledge as to how to do it better.

Method

Were we concerned only with gelatino-chloride paper, there is perhaps no better or more direct means of printing a cloud into the blank place representing the sky of the landscape-negative than to first print the landscape and then paint over the image where it is adjacent to the sky with water-color gamboge, covering the remainder of the printed part with opaque or non-actinic paper, and

then adjusting the cloud-negative to the space it is re-

quired to fill, and print therefrom.

In the first washing-water before toning, the gamboge washes off from the image, which, owing to its yellow color, it has protected from light. Of course, the skyline of the landscape must have been followed with great exactness, otherwise light patches where the color has gone too far or dark spots where some part has been unprotected will be the result, and these, being in such a delicate and conspicuous part as the horizon, will be more serious blemishes than if in a darker portion to print.

Another Method

The more usual course is to first print the landscape, and then, adjusting the cloud-negative, cover the print with paper or card, and just above the sky-line bend up the edge of the card so as to vignette the cloud nearest the horizon into the sky-line of the landscape; but there is



a serious objection to this, which should, I think, con-

demn it at once. Fig. 1.

The purpose of the bent-up card is to graduate the printing so that there shall be no perceptible line of demarcation indicating where the light action has ceased. This can only be effected by actually underprinting the clouds near the horizon, and slightly printing over (even if ever so slightly) the sky-line. Now, although this may not perceptibly lower the tone and make the parts contiguous to the sky darker, yet we know that such over-printing must take place to some slight degree, and in the case of a sunlit object seen light against a dark cloud behind, it is impossible to preserve accurately its lightness and not to tint it down with some degree of printing over. Similarly, the very delicate gray of a distant horizon will be to some degree degraded. More ineffectual still does this

method appear when we have to do with an intricate sky-line, or a tree through the branches of which the sky from behind is seen. Commonly this is printed over and only the general form of the horizon is protected, with the result that the upper part of the tree, or whatsoever other prominent object it may be, comes out a little darker than the lower, whereas being more remote it should really be a little lighter and more atmospheric. Still less satisfactory from this point of view is a similar course often adopted, namely, covering the edge of the printed landscape with cotton wool. All these are but rough-and-ready means resulting in inexactness, too often leaving a light under-printed halo around the landscape image, or a greater or less overlapping dark fringe, the presence of either of which is obnoxious to us in proportion as our perceptions admit of our detecting them.

The insincere and slipshod worker No Room for may consider such methods "good "Good Enough" may consider such methods it needs no enough," but I suppose it needs no Methods persuasion from me to show that nothing is "good enough" unless there is no way better, even though the better may involve a little more trouble and effort. If such means as those mentioned are inexact when printing in contact, they are worse still when one is enlarging, and it seems ridiculous that any one should go on for long content with so elementary a method of covering the landscape whilst introducing the clouds as moving about a piece of shaped card. How is it possible that those deep tones of purple clouds, heavy with the burden of storm, bank upon bank, close down to and almost merging with the far horizon, can possibly be printed in their accurate depth without letting the light encroach on the distance; or again, when the sky-line consists of the shoulder of a hill on which a bright gleam of sunlight rests; how are we going to print the cloud which is creeping up from behind close down to the sunlit edge without robbing it of some of its brightness? One might mention instances in which the whole beauty of the picture depends on preserving the integrity of deliberately contrasted and immediately adjacent tints. What drove me to adopt some more efficient and certain method was the immense waste of material which I incurred when printing landscape and sky from two separate enlarged negatives on platinotype paper, 18 x 24 inches. Sheet after sheet at the cost of two shillings and sixpence (60 cents) each time was thrown away, because perhaps there was some little overlapping or falling short, making a bad join between landscape and cloud, and the plan I then adopted was, be it remembered, primarily intended to serve for quite large negatives, although I have since employed it with complete success with negatives from 26 x 32 down to 10 x 12, and there is no reason why even smaller sizes should not be used if trifling precautions

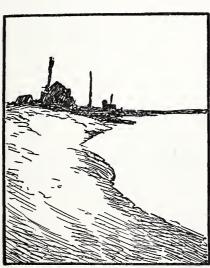


FIG. 2

are taken. Later on I shall describe second method which I have used a great deal of late, and, leaving my reader the option of either according t o his inclination, would suggest a combination of the two, the utility of which in controlling printing pictures, emphasizing or suppressing

various parts according to the impression which it is desired to convey, I hope to treat of in another number of THE PHOTO-MINIATURE.

Practical Demonstration

The order that I may be able to relate my own actual experience, leaving it for the reader to adapt what is said to his own particular requirements, I will suppose in the first instance that we are about to print from two 12 x 15 negatives on platinotype paper, the light produced image of which is, as every one knows, of an orangegray color quite invisible in the lightest tones, such as the clouds and a hazy horizon.

I will take as an example a picture entitled "The Ferry." The view of the river with its tide-bereft

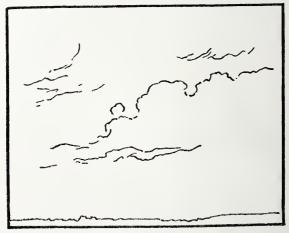


FIG. 3

bank is on a 12 x 15 plate upright way, the cloud I proposed to use being a stormy sunset taken the long

way of the plate.

Being desirous in the first instance of emphasizing the beautiful curves of the margins of the tidal river, and knowing how I should ultimately print my picture, I took the view of the ferry very high on the plate, a sketch of which is given (Fig. 2). The signaling post is only two or three inches from the top of the plate, and comparatively little sky is included. The cloud-

negative represented by Fig. 3 calls for no comment, but the finished print represented by Fig. 4 measures 20 inches from top to bottom, the print being 20 x 11 ½;

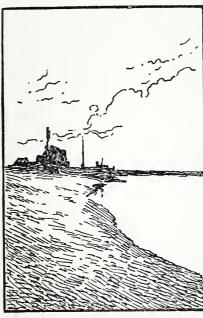


FIG. 4

the actual photograph is reproduced on another page.

I mention this here because the possibility of making, from two negatives of any given sizes, a combination print much larger in dimensions than either of them is one of the conveniences which is obtained by what I call my "drawingboard " method, which I will now describe a s simply a s possible.

Printing Without a Printing Frame

Procure an ordinary drawing-board such as architects and draftsmen use, a stout board clamped at either end to prevent warping, and made of soft,

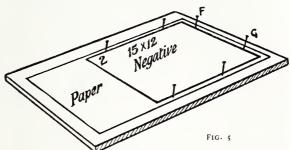
smooth wood. The size will be determined by the size of the negatives to be used, and should measure an inch or two more the narrowest way than the greatest length of the largest negative likely to be used. Thus for 12 x 15 prints a board 14 x 17 would serve, but in the example just given the print is 11½ x 20, so one dimension of the board must be more than 20 inches.

I should recommend the board being not less than 16 x 20. The board is to be covered with stout felt or cloth of good quality; the green material used for lining billiard tables is just the thing. This is to be stretched tightly over one side, not stuck down, the ends being carried over onto the other side, and there either glued or nailed. We will require some long extra-stout pins, such as in England are used by some laundries, or, in an emergency, I have purloined some small, fancy-headed hat-pins from a lady's dressing-table. A light hammer, preferably with a claw for extracting tin tacks, completes the outfit except for a couple of sheets of glass (heavy plate glass is best), the exact size of the landscape-negative; the stouter and heavier this is the This cloth-covered drawing-board is to take the place of the printing-frame, and if platinotype paper is going to be used it had better receive a thorough roasting by a fire, so as to dry out any dampness in The paper should be a little wider wood or cloth. than the base of the negative, and as long or longer than the picture is intended to be.

Lay the paper face up on the board, and upon it lay the negative, face down; at the base place two pins, tapping them into the wood with the hammer. Along one side or the other place two more pins, somewhat in the position shown in Fig. 5, and, jamming the negative against these and the pins at the base, put two more pins so close to the edge of the negative that it is securely held and cannot be moved from one side to the other, but only in the direction of the top or end that is free. The figure shows the board, the paper, and the negative lying thereon, leaving an end of paper some five inches long uncovered, with the six pins which keep the negative from slipping.

We will for the present assume that the sky portion of the landscape-negative is sufficiently opaque as not to print through, hence all we have to do is to cover the exposed end of printing paper with non-actinic paper or other opaque material, and proceed to print in the daylight. With the tips of the outstretched fingers, press the negative down to ensure its touching the

paper closer, and if, as is rarely the case, the paper shows an inclination to cockle, and so prevent uniform contact, lay your sheet of stout plate-glass on the negative and between the pins. Finally, at all times, be sure that the negative is tight against all six pins and that the board rests in a horizontal position during printing.

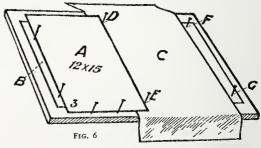


Examining the Print to see how matters are progressing, the board is taken into a room with subdued light. Personally, I draw down a light yellow calico blind in my ordinary work-room, and lift the negative up bodily, uncovering the whole of the print. This is a "full view" printing-frame, indeed, and to continue printing we have only to return the negative to its former position and again see that it touches all the pins.

The landscape portion being printed, the negative is discarded, but before shifting it make a pencil mark on each margin of the paper where the horizon comes; the pins at the sides are withdrawn, but those at the base marked F and G, in Fig. 5, had better, perhaps, be left, the cloud-negative being adjusted by the pencil marks in the margin, and, as in the previous case, six pins driven in to keep the cloud-negative from shifting. Now, cover the portion which has been printed under the landscape-negative, and print the clouds. In Fig. 6 A is the cloud-negative, B the printing paper, C the cover over the printed landscape. The pins D and E are in the waste margin of the print, and the pins F and G may be retained or not, as thought best.

Beyond the fact of being able to make a larger print without a huge printing-frame, and being able to view the whole of the print at one time, the reader may fail to see wherein the drawing-board printing method is any great help in combination printing. This is because, at present, I have purposely omitted any reference thereto, in order that the foregoing description should not become too involved; moreover, the directions just given are incomplete, because nothing has been said about covering the horizon line while printing the cloud to prevent printing short or overlapping.

Suppose, then, we obtain a piece of glass 12 x 20, that is, sufficiently large to cover the whole print, and of precisely the same width as the landscape-negative. Make a silver print 12 x 20, and then attach it to the glass in such a way that if the glass with its attached print be placed in contact with the negative, and the edges brought to coincide flush one with the other, the two images will exactly cover one another. Here, then,



you have a positive of the landscape-negative. Were it not for the costliness of it, I would suggest making a glass contact positive instead of a silver paper print, and if, when the landscape-negative is finally discarded after printing from it, this 12 x 20 positive be substituted for it, pressed tightly to the six pins (for which purpose the pins would be retained), it cannot but cover the printed image in every minute particular, and so protect it from light action whilst the clouds are being printed.

The disadvantage which may be found is that the glass intervenes between the cloud-negative and the paper, in which case place the glass positive about the cloud-negative; if the light be not very strong, this positive, which is acting as a mask, will be quite sufficiently near to the image it is protecting for the purpose; indeed, there is often an advantage in not making the "protection" with too sharp an edge.

A great gain which I have found printing in this way achieves is that at any time, so long as those pins remain in position, I can remove the landscape-negative, cover the print and begin printing the cloud, and then if I think well restore the landscape-negative and print it further; but this has more to do with the control of the print to find mention here and may be left to the later

monograph referred to elsewhere.

I have taken a rather uncommon example, inasmuch as no doubt it will be usually sufficient to make a 12 x 15 print to include both landscape and clouds; if, then, the silver print of the landscape be attached to the film side of the cloud-negative in such a way that if the two negatives be held together and viewed by transmitted light the two images coincide, then the cloud-negative will be found to carry with it the necessary mask, the point being that, instead of guessing or calculating, the pins secure absolute registration of any number of successive printings, and in between each printing one obtains ready and full access to the complete print which can be viewed in comfort by any safe light, instead of being peeped at while a piece at a time is being bent back, as when the usual printingframe is used.

For merely adding clouds to a blank Purpose believes he is already quite capable of doing by his own way in a creditable manner, all this elaboration may seem quite unnecessary. It is when one seeks to add a portion of one landscape to another, in addition perhaps to printing in clouds, that the utility of the drawing-board outfit becomes more apparent. This I will try and make clear, though it will not be easy without ocular demonstration.

Suppose we Second have a land-Demonstration scape as indicated by Fig. 7, and we desire to introduce into the foreground the group of cattle seen in the negative represented by Fig. 8. First we must enlarge Fig. 7 so as to bring the landscape in the right proportion for the cattle, which have been taken on a different scale, or, vice versa, we must reduce the cattle; in



FIG. 7

rely on judgment. Imagine the cattle already transferred, and how decide much they would measure to look in keeping with the view, and proceed enlarge or reduce accord-Next ingly. we select a suitable cloud - negative, but will content ourselves with a print same size as the landscape negative.

this we must



We begin by making a silver print of the cattle-negative (Fig. 8), and, without toning it, cut out with a fine-pointed pair of scissors or a sharp penknife the animals and as much of the ground they are standing on as may seem advisable. This is attached, film to film, to the landscape-negative in exactly the position the cattle are wanted to occupy. The untoned print will rapidly darken in the light, and the negative will yield a print of the landscape but with a white patch exactly answering to the form of the cattle. Remember that this white patch, if platinotype, bromide or carbon papers are being used, will be all but invisible after printing, and the next step is to so place the cattle-negative that, when printed, the image of the cattle will exactly coincide with the unprinted patch provided for its reception.

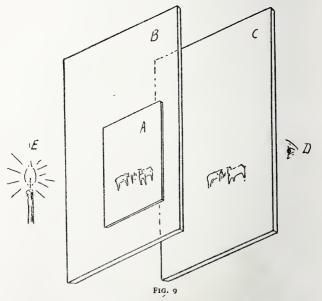
To do this, procure a sheet of glass exactly the same size as the landscape. Hold this to the glass side of the cattle-negative on end near a good light, and with the other hand hold the landscape-negative with its bit of silver print adhering, also on end, and look through all three toward the light. Their positions will be as shown in Fig. 9, but all, of course, in contact. A is the cattle-negative, B the sheet of glass cut to the exact size of C, the enlarged landscape-negative, D is the operator's eye, and E the light, either window or a

strong burner.

Holding all three together, the edges of B and C accurately flush with each other; you can without difficulty slide A about with the finger-tips on the glass, B, until you see that the blocked-out bit on C exactly covers the image of the cattle, etc., on A. Now, with a strip or two of gummed paper fasten A to B, then placing all of them in the window-frame, with C nearest the light but with film side toward you, reverse the relative positions of D and E, and carefully block out on B and A everything except the portion corresponding with the bit blocked out of the landscape, into the place of which it is desired to print these cows.

Now what we have done is this: we have produced two negatives; each is the complement of the other, the blocked-out portion of one is the part that will print in the other, and vice versa. Placed one over the other, we have a solid or opaque plate, and from whichever of the two we print first the other will print what the first leaves blank. If each successive print is in true contact with the pins, absolute registration in the combined print is assured.

First and Second Printing Printing the paper face upward on the board, placing the negative upon it film side two or three pins pressed firmly against the glass on two sides and the base. After exposure



the negative is removed, and, without disturbing the pins, the negative A B is substituted and a second printing made, whereby the first printing is not interfered with, but only the spot blocked out for the cattle is printed. The only print of this available for reproduction is given here. See illustration "Suffolk





Reproductions from uninterfered-with print and final print of BEYOND

A. Horsley Hinton

Refer to page 512



WEEDS AND RUSHES
A. Horsley Hinton
Printed from three negatives. Refer to page 520

Meadows." So far as it goes it illustrates what I have attempted to describe.

Practice
Simpler than
Theory

I do not know whether thus described this procedure sounds intricate, but it is not so in reality. Success depends on no guess-work. If the preparation of the two component negatives be properly done, the

blocked-out portion of one exactly agreeing with the unblocked-out portion of the other, and the edges of the pair kept flush, then the subsequent printings, so far as making the two images agree are concerned, are

purely mechanical.

Next the cloud is to be printed - in, The Third making a positive or print to serve as a Printing protecting mask. An alternative and sufficiently accurate method, which may perhaps seem preferable, is as follows: On the back of the cloudnegative stretch a piece of very fine tracing paper, or coat the glass with matt varnish. Assuming the cloudnegative to be very thin, as cloud-negatives should be, it will be possible to lay it on a print of the landscape made for the purpose and see the image through the clouds and the tracing paper. If not sufficiently thin, then the landscape-negative itself must be requisitioned, and this with the backed cloud-negative placed together in the window in the position these prints are ultimately to assume. Now, with crayon, BB pencil or brush, carefully go over on the tracing paper the branches, the tree crests, the leaves, and the edge of the sky-line. Below this the printed but undeveloped image may be covered with paper. The cloud-negative will now print only between the tree branches, and where we have not drawn on the tracing paper no further mask will be required.

It may be objected that this drawing on the tracing paper is separated from the image it is to shield by the thickness of the glass of the cloud-negative, but in practice this, as before suggested, is an advantage

rather than otherwise.

It is beyond the scope of this monograph to show how the drawing-board system renders easy the shading down of various parts of the print, the flattening of deSo much for what I may call my old

The Second

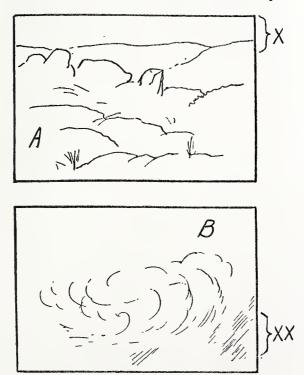
cess laid down.

tail, or, again, the raising of high lights; such modifications of the original print are made first on paperbacked glasses, the same size as the negative, and successively printed from, relying on the pins to secure the precise position, and the subsequent return of the picture-negative for further printing, should circumstances render this desirable.

method of printing, having adopted this and Later when first working from large negatives Method for exhibition purposes; the board was more wieldy; there was satisfaction in being able to view the whole of the print at once. Even if the image was only in the feeble tint of platinotype, one could judge a little as to how it was progressing, and arrest for a while some portion which seemed printing too dark or too rapidly. Subsequently, however I determined to combine whatever several parts I desired on a negative instead of on a print, wedding a cloud, a distance or other portion of one landscape with the foreground of another on one small negative and then making an enlarged negative from that. In the end I have found this saves time and material, meaning the sacrifice of a few small plates before getting the combination-negative right, and then making one big one instead of making several big ones for the successive printings. There is, I believe, less originality in this method about to be described, it being akin to the procedure adopted by some lantern-slide makers for printing in Singularly enough, few seem to use it for picture-making, nor have I seen, so far as I can recollect, precise directions given and each step of the pro-

Let it be supposed that we are work-Manipulation ing from whole-plate negatives, $6\frac{1}{2} \times 8\frac{1}{2}$ inches, and from two or more of these we are going to make a transparency or glass positive, from which in due course we may make a contact-negative for ordinary printing, or we may make an enlarged negative. We shall now not have even the faint gray image of the platinotype image to guide us, this being quite invisible until developed, so that the joining or fitting up of the negatives must be done entirely by calculation or rule.

It will usually happen that in the landscape-negative the subject occupies about two-thirds of the plate, leaving the upper one-third for clouds, or some such pro-



FIGS. 10 and 11

portion. If the horizon of the cloud-negative coincides with that of the landscape our task will be considerably simplified, but this is never, or very rarely, the case. More often the horizon of the cloud-negative is

at the extreme base of the plate, and because the proper clouds to introduce next the horizon of the landscape are those which are really and actually horizon clouds we shall require the lower part of the cloud-negative to be printed into the upper part of the landscape plate. Thus, in Fig. 10 we require to fit the space marked X with the portion of cloud-negative marked XX in Fig.

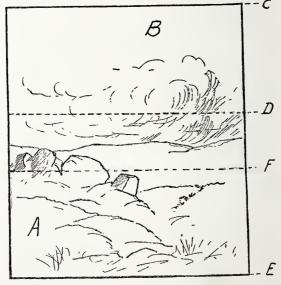


FIG. 12

11, which will be the relative positions they will be required to assume, being shown in Fig. 12, where A is the landscape and B the cloud. If now we proceed to make a 6½ x 8½ transparency, it is more than likely that we shall have to leave out some interesting and desirable part of the cloud-picture contained in the portion C D, which is beyond the compass of the plate. For this reason, in practice I have found it more convenient to make the transparency on a plate 10 x 12,

clouds	opaque or	nonacini c
opaque or nonactinic papor	Landscape	FIG

which will include the whole from C to E, and then in the final picture retain as much or as little as judgment

may determine.

One's first care is to be sure that the sky portion of the landscape-negative A is sufficiently opaque not to print through, and it may be necessary to paint out the sky to render it opaque. (See Postscript.) This done, we next attach along the upper edge of this negative on the glass side a piece of red paper reaching from D to C. When printing is done, this covers the sensitive plate where negative B will subsequently print its clouds. Similarly, to the lower edge of B another piece of non-actinic paper is attached, reaching exactly from F to E. This gives us two negatives with attached papers, the total area of each of which is the

same. Fig. 13.

Using a printing-frame a size or two larger than 10 x 12, and with a plate-glass front, we begin by placing the landscape-negative with its attached paper in the frame, film side up, wedging it lightly into one corner with strips of card, about the same thickness, but not thicker than the glass of the negative. (This will perhaps be better understood by reference to the diagram, Fig. 14.) On this place a 12 x 10 slow negative plate, or a Special Transparency plate, similarly wedging this in the corner with strips of card; close the frame and print by gaslight, as in making lantern-slides, giving a fairly full exposure. Develop this plate for excessive density, the denser the better, so long as the unprinted sky portion remains clear and unfogged. This 10 x 12 plate, with a very dense positive print of the landscape in one corner and all the rest except the margins clear glass, is to be used as a mask or cover. and may here be called the "mask," for future refer-Whilst this is washing and being dried quickly by the use of Columbian spirit or methylated alcohol, we proceed to the printing of the picture itself. For this we repeat exactly the previous performance, exposing on another 10 x 12 plate as before. After exposure, remove it from the frame, making a note as to which is the bottom edge, but do not develop it. Now place in the printing-frame the 10 x 12 mask which we have

made, film side down, wedging it into the same corner as before; next place the cloud-negative upon this film side up, and with its attached red paper reaching to the bottom edge and corner of the frame; then introduce the plate on which the landscape has already been

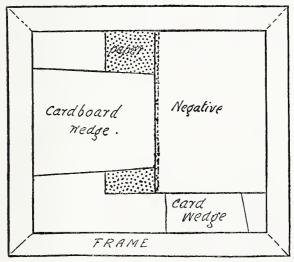


FIG. 14

printed, wedging it with cards into the corner as before, and closing the frame.

Résumé of Operations

Now let us consider what we have done, and what the frame contains.

First: Counting from the outside when the light is there, is the mask consisting of a dense positive image on a 10 x 12 plate, the part corresponding to the sky being clear glass. Second: We have the cloudnegative, the correct position of which is assured by letting the red paper attached come exactly down to the bottom of the printing-frame, a position occupied before by the landscape-negative. Third: We have the 10 x 12 plate which is to be the final combined picture, on which

the landscape has been already printed, and which is now protected from the light by the mask, but into the upper portion of which we are about to print the clouds.

An Important Factor

An important and perhaps the chief factor to success is that two sides adjacent to one of the bottom corners of the

frame secure that the mask and the subsequent picture exactly coincide; the cardboard wedges secure each plate respectively from slipping whilst the back of the printing frame is being adjusted. It may be remarked that the mask image is separated from the image it is protecting by the thickness of its own glass and the glass of the cloud-negative. This, however, is no drawback, provided the light by which the combined picture is printed falls direct and not aslant on the frame.

Printing-in
Parts of
Negatives

If, now, the reader has been able to follow the foregoing,—and if he is not I am aware it may not be entirely his own fault, for it is not easy to clearly set forth

a matter like this-he may have seen that by applying the same principle there is no reason why a portion of any one negative should not be printed into another on which a space has been masked out to receive it, registration of the two consecutive printings being secured by keeping the plates tightly wedged into one corner of the frame. It is, indeed, chiefly for such combination printing that I have myself adopted it. The reproduction of the picture titled "Beyond," given in this number, is from a whole plate positive into which the principal part of the subject is derived from one negative, the little strip of gray distance is from a second, and the clouds in the small portion of open sky are from a third. This resulted correctly without misfit or blemish after only two or three trials; then with this complete combination-positive in hand I was able to make my enlarged negative, the waste of material incurred in getting a satisfactory result being limited to a few 6½ x 8½ slow negative plates. I hope that the comparison of this with an uninterfered-with direct print from the single negative, will be a justification of the means employed.



TO THE HILLS
A. Horsley Hinton
Printed from three negatives. Refer to page 522



SUFFOLK MEADOWS

A. Horsley Hinton

Reproduced from an ex, erimental print. Refer to pages 502-4



 $\begin{array}{c} Land \text{scape and clouds for Suffolk Meadows, without the cattle} \\ A. \ Horsley \ Hinton \end{array}$



FLEETING AND FAR
A. Horsley Hinton

Printed from three negatives. Refer to page 522

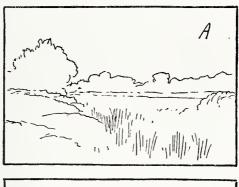






FIG. 15

Let me now take another example of Another three negatives combined to produce Example The method employed is one picture. identical with that already described, but it will doubtless make matters clearer if I go through the procedure again step by step. Here, then, we have three negatives, -A, a landscape in which the distant sky-line seems rather abrupt, and to which it is proposed to add a dis-

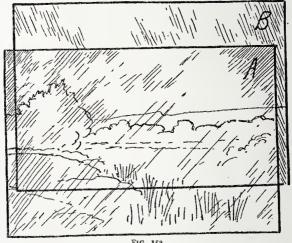
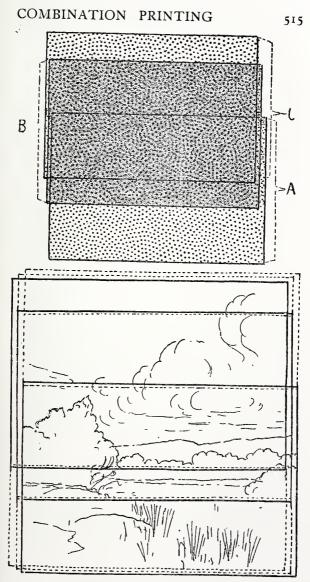


FIG. 15a

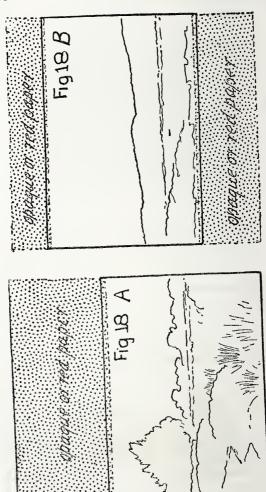
tant hill taken from negative B, and thirdly a cloudnegative, C. Fig. 15. Take the negatives A and B, placing one behind the other, and determine where the

hills from B are to come in the landscape A.

It will be seen (Fig. 15a) that the top and bottom of each do not coincide, but the sides or ends must do so; then attach to the base of B a piece of non-actinic paper to exactly reach to the bottom of A when B and A are held in the desired position. We may now introduce the cloud-negative C, and holding all three negatives in the positions their several parts are to ultimately take (Figs. 16 and 17), make up the size of



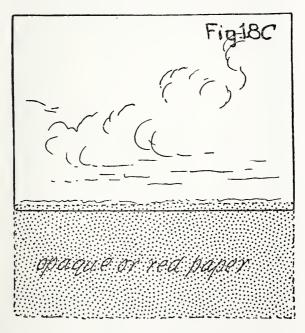
FiGS. 16 and 17



each by attaching to their ends non-actinic paper as

shown in Fig. 18.

We have now three negatives which, including their attached papers, are all the same size, and the wish may perhaps arise that all three could be superimposed and printed simultaneously instead of in succession. It is



assumed that the sky portions of A and B are opaque, or have been made so; no blocking out will be required on C, the attached paper coming just below where the sky-line will ultimately fall.

Making
Mask A

As in the former instance, we proceed to make a 10 x 12 positive on glass from A. In a corner of the printing-frame place negative A, film side up, as ordinarily for print-

ing, and wedge it tightly into the corner with cards. Next lay upon it a 10 x 12 plate, film side down, in the usual way, being careful that this also fits exactly into the angle of the frame, and wedge it so that it cannot move, the red or opaque paper attached to A covering that portion of the 10 x 12 plate which is to be occupied later with the hills and the clouds. Close the

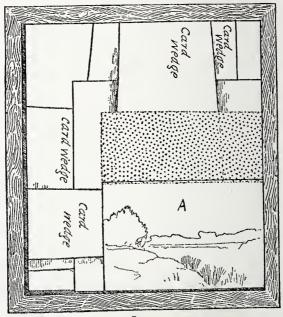


FIG. 19

frame and make an over-dense glass positive, which we will call mask A. Fig. 19 shows the front view of the printing-frame, not the back or inside, as in Fig. 14.

When we presently proceed to make the combined picture we shall first print from negative A, then cover it with mask A while adding a printing from B, and we shall then require a mask for the printing of A and B

whilst the clouds are added from C. Each addition must have its appropriate mask made by a combination of all the preceding components.

Making Mask B

Next we place negative A in the same position as when making mask A, and repeat exactly the operation of printing from it on another 10 x 12 plate. Remove A and sub-

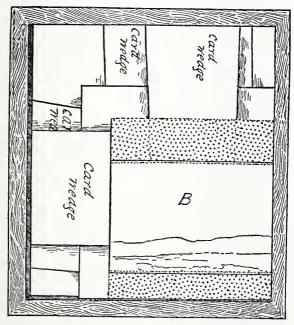


FIG. 20

stitute B, taking care that by means of the attached paper it occupies its proper position relatively to the undeveloped image from A, then expose and develop. The front of the printing-frame thus set up is shown in Fig. 20. Here the paper attached to the top of B will again protect the space to be afterwards occupied by clouds, and the piece attached to the base will ensure the nega-

tive being at the proper height to bring the hills into

the required place.

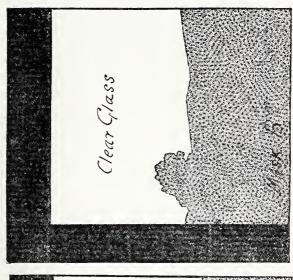
From this exposure we shall get a mask which we will call mask B, which will be a combination of A and B, and this will be used to cover the result of both printings when we come to make the final picture. Mask A will exactly agree with any subsequent exposure from negative A, and will cover it during additional exposures. So mask B will correspond with the combined exposure with negatives A and B, and cover what has been printed therefrom. Mask A and mask B are shown in diagrams Figs. 21 and 22, the black border in each case being the waste margin of the 10 x 12 plate, which need not be taken notice of.

It may here be remarked that even with full exposure and strong development we may not be able to get sufficient density in the masks to form a really efficient protection, and hence we may either intensify them or in-

crease their opacity by painting thereon.

We have now all that is required for proceeding with the final stage, the act-Making the ual making of the combined picture. Combined Take negative A and begin as before Picture when making the masks, wedging the negative and plate into the corner with pieces of card, remembering that on this depends whether or not the masks cover and subsequent printings join later on. Expose, and then substitute for negative A the mask A, place film side down, i. e., film toward the plate glass front of the frame; on this place negative B; restore the 10 x 12 plate on which we have exposed with A, and expose; then remove mask A, substitute mask B, introduce negative C; restore the plate we are printing on to its position, in each and every case wedging tightly to prevent shifting, and make the final or third printing, the development of which should result in a combined positive or transparency, such as the picture entitled "Weeds and Rushes" reproduced in this issue.

Now, it seems to me that the tiny piece An Analysis of distance, which of course assumes much more importance in the large picture, makes a difference which it was worth the trouble







of an additional printing to secure, preventing the sudden termination of the distance and introducing a still more distant plane. Again, without something more than a rough-and-ready masking of the top of the principal trees it would have been impossible not to have interfered with some of the lights thereon, whilst no contact paper mask would cover the view so effectually. In another example reproduced in

"To the Hills" these pages, entitled "To the Hills," the mountains seen clearly defined against the sky were introduced, the foreground and middle distance being in reality the edge of some grass-covered sand-hills, which ended abruptly in the seashore, the suggestion of a tiny peep of a lake at the foot of the mountain being actually a peep of the sea. I do not think it would have been possible, except by the means of exact masking described, to have printed in the clouds without overlapping the distance and obliterating some of the delicate touches of sunlight seen on the mountain.

In another example, "Fleeting and Far," if examined closely it may be seen "Fleeting that on the extreme right in middle disand Far" tance (hardly discernible in the present greatly reduced reproduction), is a ridge of hills, the form of which is repeated on a slightly larger scale by the furthest hill ridge, the latter being placed further to the left. From this it may be guessed that when photographing the marshy foreground there was a pleasing ridge of dominant hills to the right; but I could not include both in the same plate, and so a separate plate for the hills was exposed (all but the part required being subsequently blocked out), then slightly enlarged in order to give them greater dignity and importance, and finally a combination transparency made in the manner I have tried to describe. Here surely is precisely what the sketcher might have done, shifting a range of hills a little so as to bring them into the picture for the sake of better composition, exaggerating, i. e., enlarging them slightly for the sake of truer impression. It is in this addition to or subtraction from the original negative that the methods here described may be useful.

I am aware that much of that which I have been describing may sound like trickery and juggling, and yet the mere fact that it so greatly enlarges the photographer's scope should justify it when photography is being used not to record; but to afford the photographer the means of idealizing the landscape, and if this combination printing can thus be employed for landscape subjects, it is certainly not less adaptable to figure subjects, etc. Indeed, in near views and interiors one's course would probably be fraught with less difficulties because of the fewer subtleties of softened outlines in distances and delicate atmospheric effects.

The instance of cattle being introduced into a landscape print from another negative given under the description of what I have called my old, or "drawingboard" method, could be repeated with this later process with perhaps even greater certainty and success. Further, it needs only to be pointed out that a means of introducing additions may as well be made a means of obliterating, and a figure or other object not desired in a landscape could be blocked out, and a portion of a grass-field, a bush, a boulder, or what not, from another

negative printed in its place.

Finally, let me again caution the pho-Conclusion tographer against utilizing combination printing without the utmost care for proportions, relative tone and uniformity of character. uniformity of lighting, and also of definition, and never let enthusiasm or haste make one blind to printing sharply defined objects into a plane in which objects are somewhat out of focus, or vice versa. There must be the same lighting, the same focusing, perspective, and the scale must be true throughout. The only objection to combination printing is that the result too often looks like a built-up construction, in which case the fault is not with the means employed but the manner of their employment. Combination printing will tax the student's sense of right composition to the utmost, and one test as to whether the result is good will be that each of the combined parts is so essential to the whole that to cover any one destroys the harmony of what remains. For this reason combination printing should not be resorted to unless it is felt that the addition or elimination of something is essential for improvement. There must be no additions or introductions merely for the sake of adding. Most photographic pictures, as we know, may be found fault with for containing too much, few indeed, for containing too little; but, as I stated in my introduction, the purpose of this little book is neither to advocate nor to condemn combination printing, but merely to set forth such methods as I have myself practiced.

A. HORSLEY HINTON.

POSTSCRIPT

Blocking Out Skies

Throughout; no sky, be it cloudless or not, is truly represented by white, and especially a uniform, ungraduated white. Such an unsullied blank is, however, essential for printing in a cloud from another negative.

It will be far better to make up one's mind at once not to attempt to get an opaque sky area by development, for to do so would be to simultaneously upset the true gradations of the rest of the subject. Hence we must face the necessity of blocking out the sky so that it will print white, and a suggestion as to how this may best be done will form a fitting note to the fore-

going description of cloud printing-in.

If the sky-line of a distance be carefully considered it will be found almost impossible to say just where it ends, the utmost fringe of the distance being softened off, and if the sky space immediately adjacent be painted over on the film side a hard, crisp outline will result, which is quite intolerable. The best plan will be to first coat the negative on the glass side with matt varnish, or stretch thereon a piece of very fine tracing paper, as free as possible from granularity. To stretch this paper, proceed as follows: Cut the paper a little

larger than the plate to be backed, and thoroughly wet it by immersion in water; place between damp blotting paper and allow to remain whilst with a fine camel-hair brush a narrow edge of strong adhesive, such as fishglue, be applied to the back of the negative. This adhesion edge need only be as wide as the clear glass edge where the plate has been protected by the rebate of the dark slide. Lay the plate glass side down on the wet tracing paper, see that it adheres everywhere to the edge, and set on end to dry. All the wrinkles and creases will disappear as the paper contracts during drying. When dry, place the negative on a retouching desk, or in the window-frame, and with a very soft black lead-pencil, BB or blacker, carefully follow the sky-line, shading the contiguous sky portion as black as can easily be done. This leading need only be carried to say half an inch into the sky, as the rest can be blocked out by a stroke or two of a paint-brush charged with opaque red pigment, or by attaching red paper. This done, apply retouching medium to the film side all along the sky-line, and with a medium retouching pencil, Faber No. 2 or No. 3, make good on the film side any little omission in the shading on the tracing paper back. If the whole sky-line be followed and the adjacent sky darkened, this will be the safest course. By this means the sky will be rendered opaque for printing; at the same time we shall avoid either an unnatural crisp outline as well as the opposite, a dark halo caused by a semi-transparent sky.

No special recommendation need be given as to developer, but lest any one should be curious I may say that for the development of the original negatives, the transparency "masks," which need to be extra dense whilst the clear glass "sky" remains unfogged and colorless, as well as for the final combined transparency and the enlarged negatives, I use only rodinal, keeping the usual 10 per cent potassium bromide solution at hand, and modifying the dilution of the rodinal solution as judgment directs. I find no difficulty in getting any degree of density with the aid of bromide, whilst its cleanliness and freedom from stain is at least pleasant.

But I have no reason for doubting that other workers will get the same results with other developers.

In order to avoid discoloration or Fixing Bath staining, I employ an acid fixing bath, made, I am afraid, on unscientific lines.

Into a dish of water I cast a handful of hypo, and a pinch or two of sodium sulphite. Whether this is theoretically wrong I do not know; in practice it is perfectly satisfactory, and I have not changed my methods for some years.

A. H. H.

BOOKS

The reader will readily understand from his perusal of Mr. Hinton's monograph that a comprehensive grasp of picture-making by photography is essential to the successful practice of his methods of combination printing. The knowledge of what is desirable in a composition and what must be left out can be had in many books, but it will probably suffice if we mention here a single work which most directly supplies this information in line with Mr. Hinton's practice, viz.:

Practical Pictorial Photography. By A. Horsley Hinton. Part I: A simple statement of the theories which govern art work in photography and working instructions as far as it is possible to reduce it to practical rules with Part II: Numerous examples and types showing the application of the practice and theories given in Part I. London, 1900. Parts I and II separately, 50 cents each. Two parts in one volume, \$1.25, cloth.

Poore's Pictorial Composition (second edition, 1904, \$1.50) also offers much helpful information for the picture maker in photography.

Potes

The professional photographers' associations are announcing dates for their forthcoming conventions. Those already fixed are: the convention of the Photographers' Association of America (the national organization) at St. Louis, Mo., October 3 to 8; the Indiana Association, at Winona Lake, Ind., June 27 to July 1; the Illinois Association, at Aurora, Ills., May 3 to 5, and the Wisconsin Association, at Milwaukee, April 27 to 29.

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A writer in *Der Photograph* asserts that, despite the universal popularity of amateur photography in Russia, the results are, on the whole, deplorably weak and lacking in seriousness, due to the absence of seriousness among Russian amateurs. An exception must be made in favor of the amateurs of Moscow, who, by their exhibitions, have shown commendable enterprise and whose work is characterized by its pictorial quality.

4

Looking through the first volume of *The Photographic News* (1858) a few days ago, we came upon a technical paper contributed by "Mr. John Nicol, of Edinburgh," none other than our old friend John Nicol, Ph.D., now editor of the *American Amateur Photographer*. Nearly fifty years in photographic journalism is a remarkable record, but, on looking into our biographical pigeonhole, we find that Dr. Nicol's experience in photography goes even further back than this. The record reads: "On May 9, 1841, which I remember was a Sunday, I ground the mouth of a gallipot until it was air-tight when covered with a plate of glass, to be used as an

iodizing box (in the daguerreotype process)"! We hope that Dr. Nicol has a note-book and will add to its pages for many a year to come.

An interesting paper on the "Measurement of Photographic Intensities" forms the subject matter of Circular No. 50, issued by the Harvard College Observatory, Cambridge, Mass., under the direction of Mr. Edward C. Pickering. The investigations described began in 1861, when Professor George P. Bond made comparisons of the light of the sun and moon. Latterly the work has been continued by Mr. Edward S. King, whose investigations are described at some length in the circular and in the Annals of the observatory, Vol. XLI, No. IX. The purpose of the work is to obtain a scale of photographic intensities with which all sources of light may be compared and to which they may be referred, a work promising great usefulness in photography.

The Professional Photographers' Association of Great Britain includes 474 photographers on its membership list.

An open letter. Having enjoyed and absorbed the common sense of the following letter from a subscriber (with a firm resolution of amendment for the future wherever it is possible), we take the liberty of printing it as an open letter for the guidance and encouragement of all scribes who help in the making of photographic literature from this date on.

"As a reader of THE PHOTO-MINIATURE, and a student of photography with more enthusiasm than time or money to spare for it, I want to take the liberty of saying a few words by way of suggestion for a future number of the magazine. Most amateur photographers, I take it, are like myself: the time they are able to give to this fascinating recreation is

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that which is snatched in the intervals between the hours of struggle for bread and butter, and they are frequently afflicted in spirit, and more in pocket, by the amount of time and money spent in finding out for themselves things which the experience of those who have gone before should make available. This is especially so in the matter of formulæ. A very few of us are born mathematicians, most of us achieve mathematics more or less slowly and painfully, and nearly all of us have mathematics thrust upon us in various bewildering forms when we come to make up photographic solutions. The same is true, only more so, in the chemistry of photography, and the formulæ do not help us in the way they should. The fact is that most of us need a pons asinorum to get over the deep places. De Quincey, in his "Confessions," tells of an authority who recommended not more than twenty-five ounces of opium to be taken at one time, and many of the photographic formulæ are of this character. We are wandering in the desert. Please find us a Moses to lead us out by writing for THE PHOTO-MINIATURE a "Formulæ" number, -one that will give us formulæ without trap-doors and slippery places. For instance, when a formula says so many grains of sodium sulphite, let it tell us whether the crystallized or the desiccated form is intended; where water is mentioned, let it tell us whether hot, or cold, or tepid: tell us the order in which to dissolve the chemicals; whether the ounces are avoirdupois or troy, and so on. Let me illustrate: A formula calls for a saturated solution of naphthol vellow. In the name of common sense, how is the reader to find out what a saturated solution is without wasting a lot of time in experimenting, when he might be at work making the screen he wants? Suppose a saturated solution of cyanine is called for. nine at eighty cents to a dollar a gram, think of the time wasted in trying to avoid waste of money! Why doesn't the formula tell us that chromate of potassium takes an eternity to dissolve in cold water? I tried to tone some lantern-slides by the Stieglitz method given in THE PHOTO-MINIATURE No. 9. The slides could prove an alibi without any difficulty; they are as innocent of color as if they had never been within a thousand miles of the toning bath. In No. 49: Dark-Room Dodges, page 6, under the heading of "Safe Light," we have it, "cold saturated solution" of aurantia and naphthol yellow; why could not Mr. Lambert say how many grains of the dye and how many drams or ounces of water? Again, when a formula says "parts," why not add the figures in grains, or grams, or, better still, in both? We may be stupid, but help us out by a formulæ number that shall be complete and so plain that even the stupid may read and run at the same time.

Yours truly, JAS. F. FITZGERALD."

4

The friends of Mr. Gene Carbrey, innumerable from coast to coast, will be interested to hear that he is now associated with the Rochester Optical Company, of Rochester, N. Y., after having spent many years in the service of the Manhattan and Gundlach Optical Companies. We congratulate Mr. Carbrey upon the change, and wish him great prosperity with the Premo.

.4

The California Camera Club, San Francisco.-At a special meeting of this club, held February 16, certain amendments to the by-laws were made, extending the active membership list to three hundred and fifty. the same meeting the interchange slides from the camera clubs of Colorado, Montreal, and the Capitol Camera Club, Washington, D. C., were shown on the screen and were enjoyed by the large attendance present. Our California friends took practical advantage of the publication of THE PHOTO-MINIATURE No. 57: Winter Photography, by organizing a snow outing to the Sierras, at Truckee and Donner Lake, Saturday, February 20, to and including Monday, February 22. An unusually heavy snowfall made the trip exceedingly interesting from the scenic and photographic point of view. Truckee is located near the summit of the Sierras, with Donner Lake and fine skating within a sleigh-ride's distance. The trip was made in a special Pullman car, and the journey was conducted so that NOTES 531

the sights of the entire mountain trip were had by daylight—the snow-sheds, the Blue Canyon, Cape Horn, Sacramento, etc. Apparently, the expense of the excursion amounted to about \$15 per head.

A

Now and again one hears of a suspicion regarding the permanency of the Kallitype print. It is, of course, impossible to vouch for the permanency of any photographic print where due care has not been given to the preparation and manipulation of the paper. This much is certain, - that prints on Polychrome - an improved Kallitype paper made by the California Camera Company, Alameda, Cal.—retain their color and other qualities in a remarkable degree. We have Polychrome prints in our possession which were made by Mr. N. C. Hawks three or four years ago, and which are as fresh today as when they were first made. Of course the moral of this is: Use Polychrome paper. The indirect conclusion is that permanency in Kallitype depends upon the careful preparation and handling of the sensitive surface. Polychrome, by the way, is not appreciated as much as it deserves to be. It is exceedingly simple in manipulation and gives beautiful results with very little care, being especially desirable for pictorial work in the larger sizes. Those interested should write to Mr. N. C. Hawks, address as above, for a sample print or particulars of his specialty.

2

We record with regret the death of Mr. Cornelius Van Brunt, of New York, which took place Oct. 1, 1903. Mr. Van Brunt was a man of unusual attainments, and his passing leaves a gap in many of our scientific societies. He was one of the founders of the American Microscopical Society and of the New York Microscopical Society. About the year 1886 he became interested in photography and was one of the organizers of the Camera Club of New York, and an active member of the photographic section of the American Institute. Apart from microscopical work, his hobby was the photographing of plants and flowers, in which he attained a

skill probably unequaled in this country. His lantern lectures on this field of work were always numerously attended and gave intense pleasure to all who were privileged to hear and see them. The coloring of the lantern-slides from Mr. Van Brunt's negatives was undertaken by Mrs. Van Brunt, and in this difficult art she developed an accuracy of touch and color-sense which can only be described as remarkable. He possessed a genial and kindly temperament, was a delightful companion, full of information upon many topics, and his loss will be deeply felt by all who were favored with his acquaintance.

A.

The Eighth Annual Convention of the Photographers' Association of Pennsylvania will be held at Harrisburg, Pa., May 24 to 26. The work of the convention will be along educational lines and an attractive program is being prepared, including the award of a gold medal worth fifty dollars, given by W. P. Buchanan, of Philadelphia, for the best flash-light picture made with Luxo. A special prize consisting of a silver loving-cup is offered by Mr. W. F. Slate for the best six portraits printed on American Aristo Platino paper, from negatives made since June, 1903. Full particulars can be obtained from the Secretary of the Association, Mr. C. R. Gates, Lebanon, Pa.

A

We note in the January issue of El Boletin Comercial, published by the Latin American Club and Foreign Trade Association, of St. Louis, Mo., that the new president of this Association is Mr. F. Ernest Cramer, the well-known vice-president of the G. Cramer Dry Plate Company, of St. Louis. This firm occupies a prominent place among American photographic manufacturers, and much of its success is due to the energy and enterprise of Mr. F. Ernest Cramer.

During the past few years Mr. Cramer has traveled extensively in Mexico and Cuba, and his friends in these countries will doubtless have pleasure in the honor

recently conferred upon him.

Books and Prints

"An unfettered acount of American pictorial photographers as they appear to one of themselves," is the editor's description of a series of papers on "American Pictorial Photographers," appearing in Photography (London), from the pen of Joseph T. Keiley, New York. The first two chapters form a general introduction to the series, being largely devoted to Mr. R. Child Bayley, laudation of the new school of American pictorialists and uncomplimentary remarks concerning sundry photographic editors in America. The whole subject is big with interest and will, doubtless, be bigger before Mr. Keiley's series is ended. Has our brother ever pondered the fact that the creation of the heavens and the earth, "and all the furniture of them," was reported in somewhat less than a thousand words? Genesis 1: 1-31; 2: 1.

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The Half-tone Process. By Julius Verfasser, a favorite work among British process workers, is now published in an enlarged and revised edition which sells at \$2.50. The revision has been so thoroughly done that the book is practically new from cover to cover, and forms a very useful guide to half-tone engraving. The latest methods and formulæ are given, with illustrations affording practical examples of the processes described.



Camera Notes, Vol. VI, No. 4, makes its appearance with the announcement that its publication is discontinued with the present number — an announcement which will be received with wide-spread regret. Among other interesting features of this last issue are a

detailed report of the activities of the Camera Club during the past year, and a brief review of American and English photographic magazines. This last is an unsigned article, apparently prepared by the editor, Juan C. Abel. With a minor slip here and there, it is the most readable account of the sort we have seen in years.

Camera Club Notes, of which the issues for January and February have appeared, is a leaflet published by the club secretary, E. Lee Ferguson, simply to keep the members informed of forthcoming events and similar items of interest concerning the work of the club.

4

We note with pleasure that an enlarged and revised edition of *Pictorial Composition and the Critical Judgment of Pictures*, by Henry R. Poore, has just been published. This speaks well for the growing interest in pictorial composition and is a practical endorsement of our estimate of the book's helpfulness as expressed in these pages.

In his revision Mr. Poore has striven to give greater clearness to certain parts of the volume, and the argument throughout has been simplified and connected by a complete sequence of page references, which practically reduces the instruction given to a working formula. In its present form the book will undoubtedly prove still more useful to serious workers, and we rejoice in the appreciation given to it. \$1.50, net.

.42

Camera Craft, our brilliant San Franciscan contemporary, enters upon the new year under the editorship of Fayette J. Clute. Mr. Clute has served a long and laborious apprenticeship to the craft, despite his youth, and brings to the work an unusual measure of practical experience and a sunny disposition. Here's wishing him joy.

4

A happily conceived and cleverly carried out series of magazine covers is being put out by the Valley PubNOTES 535

lishing Company, of St. Louis. The peculiar interest of these cover designs lies in the fact that they are photographic, comprising twelve attractive poses of beautiful women by Strauss, of St. Louis. As an admirable example of how photography may be turned to profit in publication work, the series is one well worth attention.

A

The forthcoming volume of the *Proceedings* of the American Academy of Sciences will contain the biographical memoir of M. Carey Lea, prepared by Dr. George T. Barker, and read before the meeting of that body last April. Accompanying the memoir is a portrait in half-tone. Mr. Lea's work in science is reviewed in detail by the appreciative pen of Dr. Barker, who writes: "By far the most valuable, as well as the most extended investigations of M. Carey Lea, however, are those which related to the chemistry of photography, in which, at the time of his death, he was

acknowledged authority."

Appended is a bibliography of 101 articles on chemical subjects, contributed to various scientific journals. Besides these, there were numerous articles in photographic periodicals; some three hundred in the British Journal of Photography alone, and probably a still greater number in The Philadelphia Photographer (now Wilson's Photographic Magazine). Mr. Lea was closely associated with the late Edward L. Wilson during the first years of his editorial career, and was co-editor of the first few volumes of Photographic Mosaics. Some day we hope that Mr. Lea's writings may be available in convenient form for the student of photographic chemistry.

Mr. Lea was born August 18, 1823, and died March 15, 1897. [C. W. C.]

Ş.

Many years ago there was issued by Edward L. Wilson a curiously interesting little book bearing the legend: *Hints to Sitters*. The title-page was decorated with a couple of cupids operating the camera, and the

purpose of the leaflet was to give the prospective sitter help in the details of dress and deportment when there The leaflet was question of being photographed. was sold to photographers in thousands and by them distributed in their own localities. Since Hints to Sitters went out of print, nothing else of the kind has been put forward, and there have been many calls for a similar booklet. Photographers will therefore be glad to hear that Mr. W. I. Scandlin, Brooklyn, N. Y., has just put forth such a booklet entitled Modern Portraiture by Photography, and intended to be sent out by the professional photographer as a business bringer. The new booklet is carefully written, touches the points of chief interest to the prospective sitter, and is very neatly dressed in attractive type and good paper. We cordially recommend its use to those professionals who feel the need of something of the kind. The booklet is adapted to the needs of any studio claiming to produce reasonably good work.

.4

A newcomer in the field of photographic journalism hails from Paris, under the title of *Photo-Communications*. It consists of two pages, folio size, the text neatly lithographed in engraver's script, with "round-writing" headings to the various paragraphs, and is issued monthly.

The projectors have apparently figured out that it will fill a long-felt want in the offices of other journals which are edited mainly with the shears; and announce that its contents may be quoted without credit by anybody who is a subscriber—at \$4 per year in France, \$5

elsewhere.

Inasmuch as the entire text of the January number does not exceed 1,200 words, contains nothing of startling originality, and to a large extent draws its items from sources equally available to other editors, it would seem rash to predict a brilliant success for the venture. As we refrain from subscribing, we likewise refrain from quoting, contenting ourselves with tendering our best wishes for success and a hearty bon royage.

The Figures Facts & Formulae of Photography

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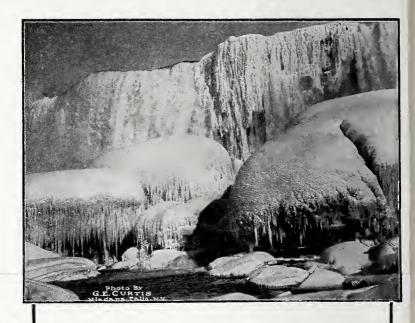
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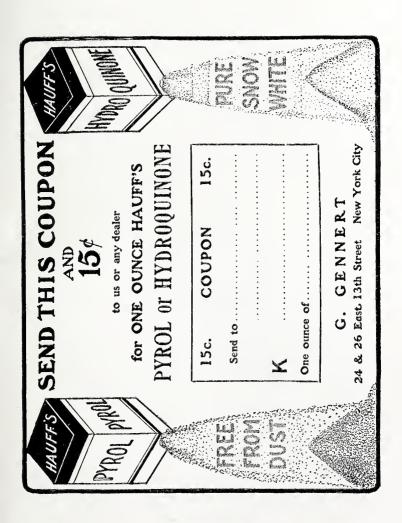
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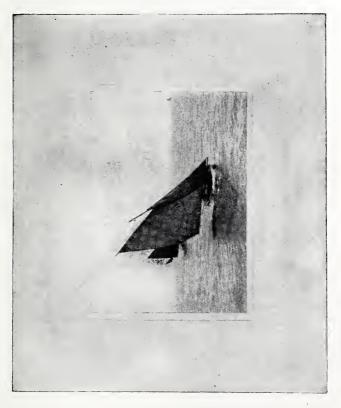
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The literary contents include a critique on the principal British exhibitions, and on the non-exhibited works, by A. C. R. Carter; a continuation of the "Hints to Would-be Picture Makers," by H. Snowden Ward; an Analytical Criticism of four of his own works, by Frederick H. Evans; and articles on the French School, by Robert Demachy; the German School, by Fritz Loescher; the American School, by Osborne I. Yellott and by Carl E. Ackerman; the Australian Work, by A. J. Hill-Griffith, etc.

To those who have not been able to visit the exhibitions it is indispensable, as form-

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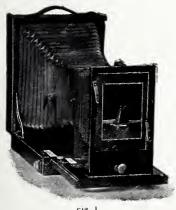
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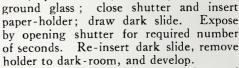


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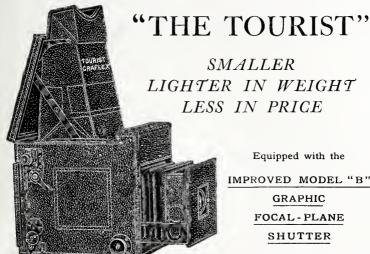
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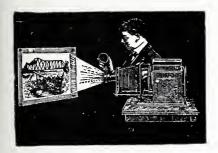
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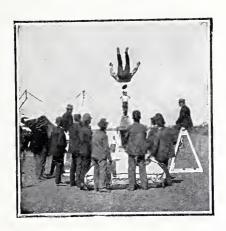
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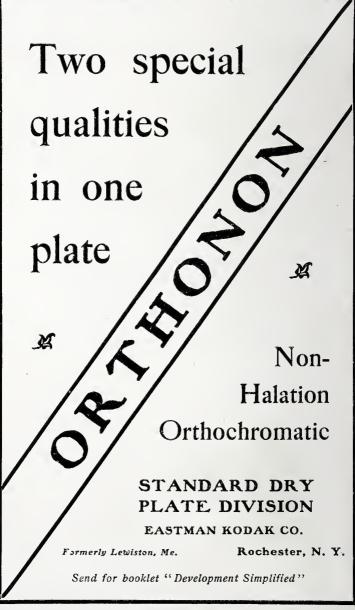
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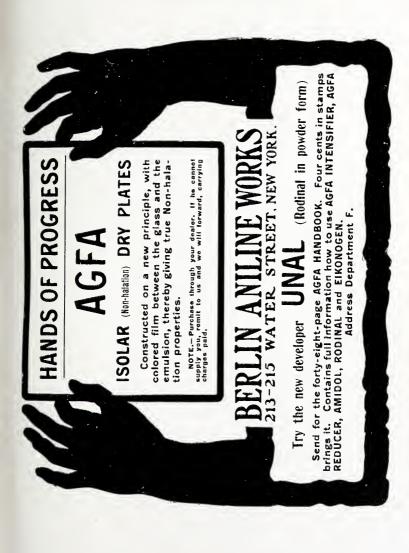
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OUTDOOR PORTRAITURE



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A Magazine of Photographic Information EDITED BY JOHN A. TENNANT

Volume V

JANUARY, 1904

Number 58

OUTDOOR PORTRAITURE

Portraiture in the open air by means of photography is a line of work that seems, up to the present time, to have been strangely neglected; its very possibilities in fact, having rarely been tested. Some few pictorial workers, it is true, have made figures the principal features in their outdoor compositions, and often with very beautiful results; but even this was mainly for the sake of the decorative qualities possessed by such figures and the additional interest lent to the landscape by their inclusion. Little or no attempt has been made at portraiture when the chief object was the attainment of a characteristic likeness, all other aims being subordinated to that end. Even among those professionals who have photographed people out-of-doors, few have undertaken this work as part of their regular business, treating it rather as a diversion and making use of their friends or professional models rather than of their clients as the subjects of their pictures. The amateur, on the other hand, while taking nearly all of his portraits outof-doors in order to obviate the necessity of the long exposures required in the house, has rarely approached his work with any seriousness, and the crudeness of the ordinary snap-shot is too well known to call for comment. Even when the amateur may succeed in landscape work, he is apt, as a rule, to consider portraiture as something quite beyond his powers; and, indeed, he possesses usually neither the skill nor the experience necessary for this most difficult branch of the art, -difficult primarily because of the swiftness and decision indispensable for success at every stage of the proceedings. Yet to those who are willing to devote both time and honest study to their work, the field of portraiture presents the most engrossing pursuit imaginable, as well as the chance for obtaining results far ahead of anything within the grasp of the average professional. The very fact that the most casual snap-shot, grotesque in its exaggerations as it may be, is apt to be far better as a likeness than the more labored attempts of the professional in his studio, only shows the possibilities of this work. That these snap-shots are rarely flattering, to put it mildly, and are more apt to be praised by the friends of the subject than by the unfortunate victim himself, is merely the result that might be expected from the entering of any one upon a line of work with which he is thoroughly unfamiliar.

Any amateur should, in time, be able The Education to make portraits that would be so good of the Eye as likenesses as to prove a source of infinite satisfaction to both himself and his friends. make photographs, however, that would be recognized as pictures in the true sense of the word is another matter, since for this there is necessary, as a rule, the same training in the principles of art as would be required for the production of pictures in any other medium. Much, however, may be accomplished in this direction by the education of the eye through the study of famous paintings, possible now to every one through the excellent reproductions on the market, and by taking advantage of the criticisms of such artists among one's acquaintances as may be induced to give their opinions honestly.

Moreover, even if his productions are not masterpieces of art, the amateur may comfort himself with the thought that the public rarely expects anything of the kind in a photograph, for there are few professionals that have had any artistic training, and their work bears eloquent witness to that fact. Nearly all the advances that have been made in the pictorial side of photography have been the work of amateurs, both because they have possessed more knowledge of the principles of art and also because their opportunities for experimenting have been greater than those of professionals. professional usually follows in the path trodden down for him by his predecessors and, rightly or wrongly, he believes that the public is content merely with that which it has always had. Even among the more advanced professional photographers the majority are slow to adopt new methods, most of them even still clinging to the now antiquated custom of maintaining a studio where their clients come to pose before a camera rather than of going directly to the homes and thus obtaining almost invariably a far more characteristic likeness as well as a more attractive picture. Such photographers could not well take advantage of the opportunities afforded by outdoor portraiture, as it would mean practically unlearning all they knew; but to all amateurs, as well as to those professionals who make a practice of going directly to the houses in any case, outdoor work comes as a pleasant variation in their daily round and offers a welcome series of new conditions to be studied and new ideas to be worked out.

The opportunity for a constant choice Possibilities of new backgrounds, the changing of the Field effects of light and shade, the chance suggestions for compositions,-all serve to keep the photographer from the ruts into which the most skilful are liable to slip. And, although professional work, to be sure, is, as a rule, not carried on to any extent in the summer, there is, even for those photographers whose place of business is in the cities, plenty of time during the fall and spring when their clients may be photographed out-of-doors at their country homes. The weather from September to November and from March to June is frequently warm enough for people to go about bare-headed and without the wraps that might prove awkward in the picture, and for the photographer himself to work with far more comfort than in the overheated rooms that usually fall to his lot.

Special Advantages It must not be supposed, however, that outdoor portraiture is advocated as a substitute for indoor work; nevertheless it affords certainly both an agreeable variety and also an undoubted chance for obtaining portraits satis-

factory under no other conditions. The particular subjects suited for outdoor treatment can be judged only by experience. Some people seem at their very best in the open air, -certain men, for example, and women who go in for athletic pursuits. There is usually a freshness and spontaneity about these outdoor portraits that make all others appear stiff and constrained, and many people who are awkward and self-conscious among the hangings and fripperies of a studio or drawing-room will be simple and natural among the more congenial surroundings of their native heath. Any tendency that there may be toward self-consciousness may also be lessened by including in the picture a favorite horse or dog and so diverting the interest of the person photographed from himself, just as the best picture of a mother is usually obtained when her attention is occupied by her children. Then, too, the evenness of the lighting and the shortness of the exposures required out - of - doors render this work admirably adapted for groups of any description, especially where any standing figures are desirable. But it is in the pictures of children, above all, that outdoor work is particularly successful. The freedom and lack of artificiality in the open-air surroundings create an atmosphere far better suited to a childish subject than the stuffy furniture of the modern house and, unless a picture can be obtained of the child at play in his own nursery, there is nothing half so attractive for him as an outdoor background. Moreover, the quick exposures possible out-of-doors allow the photographer to take the picture with the minimum of restraint for his little models, who may be allowed to play about with comparative freedom even while the pictures are being taken.

As to the outfit required for outEquipment door portraiture, nothing is necessary
but what would be used in like work
indoors. The simpler the paraphernalia the easier it
is to work with speed and to get just the picture desired
at the important moment. For this reason each socalled aid toward picture-taking should be carefully
considered before it is adopted, and its advantages
weighed against the usually more than counterbalancing

disadvantage of having an extra part to adjust or an additional screw to tighten just at the time that both one's hands and one's mind should be kept free for other things.

Any ordinary view-camera that may The Camera be used on a tripod and that may be focused upon a ground-glass back is good enough for the purpose, but it is useless to attempt artistic work with a camera of so-called fixed focus or with one where a focusing scale and a finder are supposed to take the place of the ground-glass. The picture must always be studied at full size upon the glass or it cannot be taken with any degree of certainty; and, while the finder may occasionally be used just before the shutter is opened, to assure oneself that the subject has not moved since the focusing was completed, still in actual practice the finder is of very little use.

The tripod should of course be ad-The Tripod justable to any height and should be finished with firm spikes that may be pressed into the ground. Metal tripods are lighter to carry and more compact than wooden ones, but they are usually not rigid enough to keep from vibrating if the camera is heavy or if the day is windy. Tripod clamps, to keep the legs of the tripod from spreading after it has been set up at the desired height, are rarely useful outof-doors except perhaps if the picture be taken on a porch, but even then it is better whenever possible to use a rug under the tripod, to prevent the camera from slipping. It is not only that the clamps, while supposed to move freely, are apt to stick at critical moments, but also that even the tightening of the extra screw is to be avoided, both for the actual time required in the work and also for the additional strain on the memory of the photographer, who does well if, in the stress of the moment, he always remembers to close the shutter before removing the plate-holder. For this reason it is a great help to have the tripod fitted with a turn-table. instead of the usual plate with a screw that has to be tightened after the camera is adjusted to prevent its moving. This turn-table, which seems not to be so well known among photographers as it should be, consists of a metal plate which holds the tripod and upon which the camera swings. It may, however, be left permanently adjusted so tightly that the camera can be moved around only by exerting a slight force. This serves to hold it so firmly in place that the camera can be left after focusing without fear of movement, even when the plate-holder is inserted.

The lens is, of course, the most important part of the outfit; yet, in a way

the particular lens that happens to be used is perhaps of less consequence than is ordinarily supposed. It may seem absurd to say that a cheap lens is often better than one which is more expensive, yet, regarded from an artistic point of view, this is actually Expensive lenses there may be that have been carefully adapted to meet the requirements of pictorial workers, but what are usually known as the best lenses are apt to have an extreme power of definition and, even when used without stops, to give unpleasantly The cheapest lens may possess hard and sharp images. at full aperture a diffusion of focus that gives more sense of atmosphere to the picture than one taken with a more perfectly corrected lens, which, if focused sharply, is apt to give the same result that would be obtained by looking at the object through a magnifying The only thing to be done with such a lens is always deliberately to throw it out of focus, but this is very difficult to accomplish successfully, especially in an outdoor photograph where so many planes are included in the picture. With a lens capable of more diffusion there is no need to resort to such dodges, for if the color values of the picture be correctly preserved in the development and in the printing, it may be perfectly distinct in every detail and focused just as sharply as is necessary to bring out everything desired.

But even though the lens be cheap, it should be clean and free from distortion; it should be of as long focus, compared with the size of the plate on which it is used, as the length of the bellows will allow; it should cover the whole plate clean to the very corners when free from stops (i. e., at

its full aperture); and it should be corrected to such an extent that the photographer may avail himself of the architectural lines that so often form an interesting feature of the background. Given these other qualities, speed should be the next consideration, for in portrait work, even out-of-doors, a lens simply cannot be too rapid. There is not the slightest necessity for the socalled rapid portrait lenses usually urged on the amateur by the dealers, and, despite the fact that they are used by most professional photographers, they are very rarely desirable for outdoor work, as they are usually far too short in focus and possess insufficient depth unless stopped down. The small lenses that come with hand-cameras, on the other hand, no matter how expensive they may be, are apt also to be too short in focus, and the very qualities of definition and brilliancy which are dwelt on in their advertisements as special features are, as has been said, rather a disadvantage than the reverse in the eves of the pictorial worker.

The Mind
Behind
the Tool

However, it is not the lens that makes
the picture, and, no matter how unpromising the outfit may seem to be, the intelligence back of it may transform it into

a tool capable of the most beautiful results. The main thing is to become thoroughly acquainted with one's instruments and to learn for oneself what their capabilities really are. The pictures illustrating these pages were made with a 6½ x 8½ view-camera fitted with an ordinary rapid rectilinear lens, maker unknown, its focal length being about 12 inches, and its diameter 2 inches. This lens was bought at second-hand, costing comparatively little, and was intended for the all-round use of a beginner. Later on a special portrait lens of well-known make and costing over eight times as much was bought under the impression that it was desirable, but after a prolonged trial it was discarded in favor of the first lens, even for indoor work.

The Exposure Shutter A really good shutter, admitting, of course, of both instantaneous and time exposures, is an indispensable part of the outfit; and it should be easy to set and depended upon not to stick at critical moments, as any delay necessitated

by the opening or closing of the shutter may ruin the picture. The shutters that set themselves automatically after each exposure are of course no good, for the reason that they prevent the focusing upon the ground-glass. A curtain shutter in which the shade rolls up and in closing comes from the opposite direction is better than where the shutter opens from the center and returns upon itself, giving the center of the plate a longer

exposure than the sides.

The outfit is completed by a focusing cloth and a carrying-case that should be at once strong and compact. The case should be large enough to contain all the articles mentioned, in addition to six or eight plate-holders, for one can nearly always use that number of plates or films to advantage in a single appointment. In the 6½ x 8½ size cases come in about the same size and shape as the ordinary suit-case, and, being covered with a canvas often used for the cheaper grade of traveling bags, they are sufficiently inconspicuous not to attract attention in cars or trains.

In actual experience 6½ x 8½ has been found to be by far the most convenient size for an outfit. The 5 x 7 camera is decidedly too small for portrait work unless one depends on enlarging everything he desires to preserve, while an 8 x 10 outfit is too heavy and unwieldy to carry about even for short distances. The 6½ x 8½ size reaches the very limit of weight, and the only way to get along is never to economise in the matter of cabs, porters, district messengers and the like, but to save all one's energy for the actual work of the picture-taking.

Advantage of Films

A great advantage may be gained by the substitution of cut films for plates. The weight of these films is practically nothing compared with that of the glass plates, and the danger of breakage is entirely eliminated. The films may be developed in just the same way as the plates, and, except for a certain tendency toward curling, they are quite as satisfactory. They may be loaded either in film-holders made especially for the purpose or in aluminum film-sheaths that are slipped into the ordinary plate-holders. The latter is, on the whole, the more

satisfactory method, as film-holders rarely prove entirely They are usually made with a sort of groove into which the film slips, the loose end being held down by a slide which is pulled forward over the film; but this slide is apt to fall back at any jarring of the camera and the film curls forward out of place. aluminum sheaths containing the cut films are placed in the plate-holders just as plates would be, and if the films are cut by the manufacturer exactly true in size, there is little difficulty in loading them. Owing to their lightness and compactness extra packages of films may be carried about without inconvenience, for even in the ordinary house there is always some room or closet that may be converted into a dark-room, temporarily, and fresh films substituted for those that have been used. This is a special advantage when appointments at a distance are made, as a number may be combined to advantage.

When the photographer is ready to Forethought begin work he should, before setting up his camera, consider carefully what sort of result he has in view. If what he wishes is primarily a pictorial composition, and he is fortunate enough to have friends or professional models to pose for him, he need consider the figures only as part of the picture, and devote his whole attention to an interesting arrangement of the material at hand. But if he is endeavoring, -whether as amateur or professional,- to produce a portrait that, no matter how artistic he may be skilful enough to make it, is nevertheless of value first of all because it is indeed a portrait, the matter assumes a very different aspect. Instead of trying to bring the figure into harmony with the surroundings, the whole endeavor must be to choose a background that will not only harmonise with the figure but that will be subordinated to it in interest. Any obtrusiveness in the accessories or anything out of keeping with the type of the subject must be done away with, and the photographer no less than the painter must prove himself a reader of character.

Moreover, all his decisions must be made with the utmost speed so as not to tire out his clients with too long waiting; or otherwise, no matter how patient and

considerate his models may be, the pictures will be spiritless. No matter how uncertain the photographer may be as to his line of action, he needs to train himself to appear outwardly at ease, for any faltering, any groping or indecision will reflect itself unfailingly upon the countenance of his subjects. This does not mean that the most serious study should not be given to the work, but merely that such study should precede any attempt for a time to produce successful results, just as an art student would expect to devote himself for a considerable period to making sketches that would probably be destroyed without being shown to any one. The beginner is often advised to omit the plates and to confine himself merely to the composing of his pictures upon the ground-glass, but the exposure and development are so integral a part of the picture that it is better to gain experience in all parts of the work each time. Moreover, it is only in this way that the beginner can really rectify his errors, for mistakes that are so glaringly apparent after the development of the plate are apt to pass unnoticed on the ground-glass.

Experimental Work With Models with Models out distracting the attention of the photographer by conversation. The next best thing is to press into service some friend that will be content to pose without insisting on seeing the results, if indeed such an individual can be found.

The Background are the first step to be taken, must be to a great extent determined by the direction of the light and its consequent effect upon the face of the subject. The rules that declare that the sun should always be at the back of the photographer may be entirely disregarded, for the implicit confidence placed by the amateur in these directions has been mainly responsible for the well-known snap-shot with its chalk and soot effects of chiaroscuro, the face of its victim being invariably screwed up as the rays of the sun shine directly into his eyes. It is not necessary to go to the

other extreme and to obtain merely a fogged plate by pointing exactly at the light; though, as a matter of fact, unless the sun is very low in the heavens, the photographer may work in almost any direction without

danger of fogging his plate.

As to the silhouetted effect so well known to any one who in an ordinary room has seated his model before a window and photographed directly against the light, there is very little danger of this occurring out-of-doors by reason of the amount of light diffused all around. Indeed, in dealing with people that have fair hair and blue or gray eyes, almost the only way to render the color effects correctly is to have the light come from approximately above and behind them, lighting the hair and casting the eyes into shadow. Even in the late afternoon, by keeping the tripod high enough to avoid tilting the camera upward we may obtain almost any effect desired.

The actual selection of the lighting Lighting the can be accomplished only by the careful Subject studying upon the ground-glass of the variations at one's command. Each face requires, of course, individual treatment, and it is almost useless to arrive at any arbitrary conclusion beforehand. In a studio any number of changes may be made in the lighting by means of raising and lowering curtains, of introducing thin shades to soften the effect, of illuminating shadows by means of reflectors, etc. All this is manifestly impossible out-of-doors, but it is an open question whether an advantage is not gained by the enforced freedom from the frequent artificiality of manipulated lightings and the consequent adoption of more broadly conceived and naturalistic effects. Since, however, one cannot alter the light to suit the subject, the only way of achieving a harmonious picture is manifestly for the photographer to ask his clients to move about until he is satisfied with the result. Moreover, the background also being of necessity stationary, the photographer must always include it in his observations at one and the same time with the lighting. This may seem more difficult than is really the case; for all that is necessary is to select whatever spot would seem to lend itself to the most attractive composition and then, after posing the person there, to consider its suitability for the purpose, taking everything into consideration: and it often happens that the chance suggestions for the lighting of which the photographer may avail himself in this way are more original and more pleasing than would be the perhaps more hackneyed arrangement

studied out beforehand.

If the lighting does not seem suited to the person it may often be rendered so by slight changes of position on his part; but, while the photographer may and indeed often must ask his clients to move or turn about, he should always refrain from making any suggestions as to the actual pose, as nearly always that would preclude any success in obtaining a natural or characteristic likeness. All that the photographer can do in this direction is to take advantage of what circumstances may throw in his way, and while his attention may seemingly be confined to setting up his camera and selecting a background, he should always be on the alert to fix in his memory anything in the way of a chance attitude, a turn of the head, a position of the hands, that would seem to him just what would be desirable in his picture. Having once remembered this the photographer may, if he thinks best, try to get the same position resumed just before the taking of the picture, or if he is tactful he may be able to bring it about in other ways; for while some few specially favored people may be able to pose without self-consciousness, in the case of the great majority the chief thing is to try to divert their attention from themselves in any way possible. The sense of freedom in the open air and the novelty of portraiture under such conditions is in itself a help to this end, for in this day of universal cameras nearly every one has had some experience in photography even if only in snapshots and has questions to ask as to the photographer's methods. Indeed the amateur usually sees no reason why he should not take up this work, for while the paraphernalia of the studio puts the usual portraiture out of his reach, outdoor work, with the somewhat deceptive simplicity of its methods, seems to bring the craft within the grasp of any one.

The Line of Least
Resistance
Resistance

The lighting that is perhaps both the easiest to manage and for that reason also the one most in use is where the chief illumination comes from one side.

The modeling of the features is thus accentuated and the whole face thrown more in relief than when the light comes from in front or behind. To the more artistic workers, however, too great relief in a photograph is always to be deprecated, and the somewhat stereoscopic effect achieved by some of what were thought to be the masterpieces of by-gone days is now considered most unpleasant and to be avoided whenever possible.

The lack of density and consequent contrast in the plates of the modern school, however, compared with what used to be considered necessary, is in itself a safeguard against this, and more vigorous contrasts may be used in the lighting than would be desirable were the development carried on by the old-time methods. it must not be forgotten that in the length of the exposure and the manner of development the photographer may to a great extent control the lighting, and either accentuate its advantages or minimize its defects. lengthening the exposure or by softening the development and keeping the plate quite thin, the hardest shadows may usually be rendered soft and harmonious. Conversely, while the camera may be pointed so nearly toward the sun as to blur even the image on the groundglass, still by careful development the face may be kept free from fog and the features brought out with comparative distinctness.

Sunny Days and Other Days

Cially, when there is little foliage and yet when the sun is extremely brilliant, the greatest care must be observed in this regard, and if any strain on the eyes is noticed the posing should be done in the shadow of the house or of a tree, on a porch or under a porte-cochère. A gray day is really the easiest time to work, for almost any background may then be utilised and the plate is usually sufficiently under-exposed to save it from flatness. The

shadows cast on a sunny day, however, are often so beautiful that it is well worth while to take a good deal of extra trouble to include them in the picture. The most irritating weather to work in is when the day is apparently clear but when the clouds are continually drifting over the surface of the sun, rendering it difficult

to make one's calculations with any certainty.

Composition and the Figure in arranging his composition is to make the figure entirely too small compared with the size of the plate, rendering it insignificant and giving it almost the effect of an accessory in the landscape. If he would not trust to his eyes alone, but would always do his composing upon the groundglass, he would more often avoid this error; for it is due undoubtedly to the fact that in real life the eye unconsciously focuses upon the figure, gaining merely an impression of the surroundings, and the effect is very different where the whole scene is brought in miniature down to a universal focus on the plate.

But while the figure should of course appear the most important feature of the picture, it is by no means necessary, in order to concentrate the interest upon it, to throw the background entirely out of focus. If the figure is made of at least a fair size in comparison with the area of the plate, the background and general surroundings may be brought forward with perfect distinctness and indeed lend interest to the figure rather than detract from it. In this respect the photographer should study carefully the work of the best painters and, in arranging his compositions, try to imagine that

he was sketching them in upon a canvas.

The Picture Planes

Just as the painter, too, finds the proper preserving of the various planes in his picture one of the most difficult as well as one of the most important parts of his work, so does the photographer find the focusing of the lens, for upon this depends much of the quality of the picture. Each man's methods are of course entirely distinct and do much to lend individuality to his work, the results ranging from the so-called fuzzygraph of the impressionist, where if even one spot in the picture is distinct

the remainder is merely a blur, up to the class of work generally known as commercial, where the shape of each leaf on the tree may be distinguished and where, as the photographer proudly tells you, much may be seen that could not be detected with the naked eye. Either of these results is, perhaps, easier to obtain than when one desires to focus so that both the figure, which may be directly in the foreground, and the background, perhaps yards away, may both be fairly distinct, and yet where the focus shall be so diffused as to create a sense of atmosphere.

In outdoor work some stopping down The Use of the lens is nearly always necessary of the Stop unless the person should happen to be placed against a wall or some such flat surface or unless, indeed, the only available background is so objectionable as to make it better to focus on the figure and leave the rest as an indistinguishable mass. With this stopping down, however, the greatest care must be taken not to create an unpleasant sharpness. figure is in the foreground, as is usually the case, the best way is to focus on the plane that would be perhaps one-third of the distance between the figure and the farthest point of the background that he wishes to include; then, contrary to the usual custom, to begin with the smallest stop so that he may see just what he wishes to include in the picture and gradually to increase the size of the aperture until he has reached the largest stop he can possibly get on with. If the figure then looks too sharp he must throw the focus a little farther back, but as a matter of fact nearly all outdoor portraits are made from standing figures, and the slight swaying back and forth which is sure to occur helps to diffuse the focus.

There is, of course, no reason for always having the figures standing except that it seems the most natural position as a rule out-of-doors, for there is rarely a suitable place where they may be seated. Sometimes one may use the ground, or something that happens to be around, like a rustic bench or a fallen tree trunk, but nothing could be more fatal to artistic effect than to bring out-of-doors for the occasion a chair or other

piece of furniture that manifestly belongs in the house. Moreover, though there is a sort of convention among portrait photographers to have the person seated even when only the head and shoulders are meant to show, the lines are nearly always better in a standing position and the comparatively short exposures necessary out-of-doors make it possible for the photographer to avail himself of this.

When one comes to the question of exposure, the safest rule is, never to un-The Problem of Exposure der-expose if possible. An over-exposed plate can be developed with half the trouble of one that has not had sufficient time, and it will yield uniformly better results. In figure-work of any kind, even outof-doors, the photographer can rarely give as much time to a plate as he would like, owing to the difficulty of having the figures free from movement. The best way is never to set the shutter for instantaneous exposures, but to hold it open by means of the bulb for as long as possible, relaxing the pressure before the movement becomes too apparent. Even in the case of children, surprisingly long exposures may be obtained in this way, but in any case it is better to run the risk of undertimed or spoiled plates rather than to ruin all chance of an unconstrained picture by bothering the little models too much. Even in the case of older people the knowledge that they must hold themselves rigidly still for any length of time is apt to produce a certain stiffness of posture, and it is better for the photographer to treat the matter of keeping still with apparent carelessness, telling his clients not to trouble about it as he will not be ready to take the picture for some time, and then to make the exposure, if possible, before they realize what he is about. As a matter of course, people cannot be allowed to saunter away after the camera has been set up and focused, but if they remain approximately on the same spot much latitude of movement may be allowed without detriment to the picture, and indeed to a certain extent should be encouraged where likely to help.

The photographer while looking through his groundglass should fix in his mind the whole aspect of the



COMRADES Mathilde Weil



A BUNCH OF BUTTERCUPS

Mathilde Weil

completed picture, and he should open the shutter only at the moment when everything seems right. case of children almost the only way is to try to occupy their attention with something for the moment, even if it is only plucking a flower, or pulling one to pieces,the latter task, by the way, having been found to exert an almost invariable fascination over the infant mind. It is much harder to photograph children at play out-ofdoors than in the house, for the reason that the games are apt to be of too active a nature. If everything else fails one can always have recourse to telling them stories, and if the services of the mother or nurse can be impressed at this point so much the better for the long-suffering photographer, who must, however train himself at all times to be able to carry on seemingly lucid conversations with his clients, while his whole attention is in reality strained in concentration upon the taking of the picture. For it is unfortunately the case that with many people, whether young or old, the only way to prevent what has been called the picture-look from coming over their countenances is to try to engage them in active conversation throughout the entire appointment. picture can, of course, be taken only while the photographer himself is speaking, so the best way is for him to open the shutter just as he commences a sentence and then try to hold the attention of his client during the exposure without giving an opportunity for reply. would be exceedingly convenient if the photographer could be accompanied always by an assistant, who could take this part of the work upon himself and thus leave the photographer's mind free for the actual picture-taking; but no two people, unless they were gifted with clairvoyance, could work together in such a manner.

In the short exposures possible, however, out-of-doors the task of gaining an unstudied pose and a natural expression is greatly simplified. Yet, while an instantaneous exposure, whether in the house or out-side, is always possible and may even in the majority of cases be advisable, still the photographer should realize that this is merely by reason of the exigencies of the case, and he should always strive to expose the plate for just as long as circumstances will allow. In portrait

work it would be rare indeed that his plate was overtimed, for as a rule the negatives of almost all photographers, whether amateur or professional, are sadly under-exposed and would be infinitely more artistic had a longer time been given them; or, if that was impos-

sible, had they been developed accordingly.

It is impossible to give any rules for the actual length of the exposure, as this would vary indefinitely according to the rapidity of the lens and the intensity of the light, but it may safely be said that where a photographer is used to considering half a second, perhaps, as the correct time for the exposure, he should try the experiment of giving four or five seconds and developing the plate in just the solution that he would use for the shorter exposure. Of course only the most rapid plates should be used at any time.

Orthochromatic plates or films, together with color screens or light filters, may give excellent results for landscape work, but they are manifestly impracticable for portraiture, owing to the increased exposure demanded by them. It is an open question, moreover, whether the few experiments already made in this direction have not seemed to show that approximately the same correctness of values may be preserved by the use of ordinary plates provided that the exposure is very

considerably lengthened.

Where, however, it is impossible to Developing give as long a time as one would wish, the Plates and in portraiture this is usually the case, the next best thing is to try to force the plate, as it were, in the development. It is far too commonly the case, with professionals as well as with amateurs, for the photographer to fancy his task completed with closing of the shutter, and to turn over to some one else the task of the development and the printing. In the creation of a photograph, however, each successive step is as important as those which have preceded it and, unless the same person carries the whole work through to its very completion, nothing but a mechanical result need be expected. Even those amateurs who do their own printing often give their plates or films out to be developed; not so much that they mind the work involved as that they think the results will be better. They may be better technically, it is true, though this is not always the case, as the work is usually given to any local photographer or to whichever one underbids his competitors and slaves all day long at starvation prices: but even if the development were carried on by the most skilful person to be found the result would probably be no more artistic. The carrying out of any work of art can be accomplished only by the one that conceived it and that saw the finished picture in his mind's eye clearly from the start. No matter how well the work might be done by another, the result would be much as if two painters combined on a picture.—the one whose strong point was draftsmanship, sketching it in, and the other, who might be better in color, laving on the paint.

The particular developing agent to be used is all a matter of individual choice. Developer some photographers advocating one and some another. In the examples reproduced with this monograph metol happened to be used, it having been adopted in the first instance because it was supposed to be specially adapted for under-exposed plates, and adhered to because it was found just as satisfactory as anything The main thing is to stick to one developer and learn its special mode of treatment; for when each set of plates is exposed under totally different conditions, as is the case with any photographer who does not use a studio, the testing of a developer is very difficult. Metol, however, keeps well if made up according to the twosolution formula that comes with the bottle; it is clean, never staining the fingers unless any remains of an intensifier be left on the hands; and the irritation or poisoning of the skin complained of by some in connection with it is a matter that can only be tested individually, the writer never having experienced anything of the kind. Metol, too, is supposed to tend in its effects toward flatness and lack of density and, as the main difficulty with under-exposed plates is to keep the high lights from getting too dense while trying to bring up the shadows, any softening of the negative is in that case to be welcomed.

exposure.

If a plate seems to be flat and lifeless, it may be allowed to remain in the developer until it gets somewhat denser than one ordinarily would wish, while if the contrasts are too great the result may nevertheless be rendered harmonious by keeping the plate very thin. The quality desirable in a negative depends, of course. entirely upon the individual preference of the photographer, who must also always consider the character of the paper he would like to use it upon, as each make requires a very different type of negative. In general, however, as has been said, a thinner negative is used by the best workers nowadays than was formerly the cus-The speed with which metol works, the whole image flashing up in the time usually required in other developers for the high lights alone to appear, is a great saving of time to the expert, but the beginner may find it hard to adjust his actions to the necessities of the case. A little experience will soon remedy this, and if he begins with metol at the very outset of his career he will not fear the fogging of the plate as he would if accustomed to other developers. The solutions may be modified for

Modification under or over exposures, according to the usual directions on the subject, but in addition to this an aid which is not so well known is that which may be afforded by the temperature of both the plates and the solutions. All the directions say merely to store plates in a cold place, but, if there is any suspicion of under exposure, the plate should thoroughly warmed before its development is attempted. This may be done by putting them in a moderately warm place, as in front of a register or steam-heater, to thaw them out, as it were, before beginning to develop them. It is known of course that two warm a developer will cause flatness in the negative and also that most of the rules advise the photographer to try to preserve his trays and solutions at an equable temperature, by warming them in the winter and icing them in the summer, still, that is about as far as the information goes, and very few operators realize that

they may by this method overcome deficiencies in the



PHYLLIDA Mathilde Weil



ONCE UPON A TIME Mathilde Weil

The temperature may be made to play The a very important part in the work, so Influence of much so that an under-exposed plate Temperature may be placed in a normal developing solution and allowed to progress without any modification of the developer except that of first thoroughly warming both tray and solution. The temperature can really be raised to a surprising degree without having the film melt, but still one must apply what has been termed the hot-water treatment with some little judgment, and a beginner would do well to try it for himself on an unexposed plate before experimenting with it on some cherished subject. As the solution is constantly cooling unless the dark-room is made unbearably hot to work in, one cannot test the temperature with a thermometer with any degree of accuracy, and the easiest way is to judge it entirely by how it feels to the touch. It is perfectly safe to use it when it feels about tepid, even to a finger protected by a rubber glove.

There seems to be little danger of the warmth fogging the plate; indeed, the writer has never known it to happen except when an attempt has been made to bring up an under-exposure by soaking the negative in warm water, to try to bring out the details before transferring it to the developer in order to build up the density, but, though the warmth may have increased the tendency of the plate to fog, this is wont to occur when any sudden change is made in the developing solutions. temperature is too great the photographer will speedily discover it by seeing the film dissolve away before his eyes; but, if this should seem imminent, through the slightest streaking of the negative being observable, he must, of course, take it at once from the tray and plunge it into the fixing-solution; and, needless to say, be careful not to let his developer be so hot again.

As the heating of the solutions would be a good deal of trouble, the easiest way is to keep a kettle of very hot water at hand and in diluting the developer to its proper strength to add hot water instead of cold, or at least as much of the hot water as is needed. If the trays and graduates are heated by pouring the hot water into them they will usually retain the warmth for some time,

though this should be repeated whenever they grow too cold again. When the developer cools and it is undesirable to add more water it may be heated by pouring it back and forth between hot graduates, though a very little of the boiling water will usually be of sufficient effect and the dilution of the developer hardly noticed.

No special care need be taken in the fixing and hardening of the plates, though it is just as well always to use either fresh hypo or an acid fixing bath. The former is perhaps the less trouble, as, unless the acid bath is changed frequently, it is apt to leave an iridescent deposit upon the plates, and the fresh hypo solution is

always so cold as to harden the film immediately.

If films have been used instead of After-treatment plates, they must be soaked in a weak of Films solution of glycerine and water after they have been fixed and washed, in order to prevent them The exact proportion of glycerine is from curling. difficult to determine, for the reason that on damp days the moisture in the air seems to affect the film and, if the same amount of glycerine is used as on dry days, the gelatine will remain sticky even when dried over About eight ounces of water to one of glycerine is a good proportion, and if the films are pinned up to dry by the four corners this will lessen their tendency to curl. Or they may be left to dry in the aluminum sheaths in which it is usually convenient to fix and wash them, and if they have been well soaked in the glycerine solution they will rarely curl forward. Manufacturers are now experimenting with films that are warranted not to curl, but they are not satisfactory for portraitwork, as they are too thin to be retouched easily. In any case, they are at present made only in small sizes.

The printing, which is the final step in the proceedings, is nearly always in the case of outdoor portraits a pleasant surprise to the photographer. The beauty of the atmospheric effects and the delicacy of the gradations resulting from the extreme diffusion of the light possible only out of doors are not always suspected even from a study of the plate, and to the photographer accustomed

to the concentrated and unnatural's powerful light of a studio they come as something little short of a revelation. To bring them out in the print in all their loveliness is a task calling for the utmost nicety of judgment, for it is rare that any one make or quality of paper will be suited to all negatives. The choice of the particular paper and the best method of printing and developing it is of as much importance in the picture making as any other part of the work and can be no more safely intrusted to any one else. So much, indeed, of the quality of any photograph depends upon the way it is printed and so much can be done in the way of remedying defects in the negative by skill in the printing, that one may, without exaggeration, say that the surest way of ruining all artistic value in a photograph is to allow the prints to be made by an outsider. Just as in the developing, no matter how much more experience another might have, and no matter how much better technically the results might be, they would be certain, artistically, to be worse than if the same person carried on the work throughout. In printing too, of all things, one could never explain to another just what was wanted, for the reason that, unless the photographer actuually experimented for himself, he never could tell just what he could get out of the negative. Indeed, it happens sometimes that in printing from a plate that has not been used for some time, he gets, under fresh conditions and with a fresh inspiration at the moment, results so far superior to the earlier ones that he only wishes he could get hold of the old prints and substitute the new examples for them. Conversely, he can rarely repeat exactly a print that he has made unless they are all done at approximately the same time and developed one after the other. Everything makes so much difference,-the condition of the atmosphere, the strength of the sunlight, the temperature of the day and also of the developing solution, the number of times the same solution has been used, even the quality of the emulsion on the paper, no matter how uniformly it is supposed to runall these cause infinite variations in the print, as do also numerous other conditions at the moment, chief among them being the mental attitude of the photographer. So well is this understood among the more artistic workers that often one pet print which they know they can never hope to reproduce is cherished with even more care than the negative from which it has been made.

The fortunate photographer is he who has time to experiment with one negative in different ways of printing until he has assured himself that he has obtained from it the best results, comparatively speaking, of which it is capable. Certain modes of treatment that have proved successful with other negatives of seemingly the same order may for no reason that he can assign be ruinous with this one; and all he can do is to keep on trying either until he exhausts all that he can think of at the time and must, if he be a professional, fall back on the best that he has made, or until he by accident, as it were, makes a print that he feels instinctively to be that for which he has been looking. To call its creation an accident, however, is in reality somewhat a figure of speech. For though in photography, of all things, it is the unexpected that often happens, the insight and experience that lead the artist to take advantage of the accidents that fall in his way are in themselves qualities of no mean order.

Let no one start out pinning his hopes of success upon accidents, for nothing could be more deluding. The apparent ease and spontaneity that characterise any successful picture are in themselves an example of the art that conceals art. If the mind of the spectator is filled with the satisfaction resulting from the seeming inevitability of any composition, he may feel reasonably sure that the certainty of the artist in its production was due far less to the accident of the moment than to arduous labor put into the picture by him in the attempt to conceal the mechanism. Nor need genius nor even talent be held alone accountable for the superiority of certain photographs over their fellows. If Goethe's description of genius as an infinite capacity for taking pains be considered somewhat too sweeping. Edison's modification of the definition at least will be found to be pretty nearly correct. "Genius," he says, "is 2 per cent genius and 98 per cent hard work."

MATHILDE WEIL.

Potes

The Akron (Ohio) Camera Club will hold its first annual photographic salon at its rooms, from April 4 to 9 next. The coöperation of all pictorial workers is invited and will be welcomed. Full particulars, regulations, etc., can be had on application to Secretary Charles E. Smith, Akron, Ohio.

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The subjoined letter and circular, relating to new regulations affecting the photographic exhibit at the forthcoming World's Fair at St. Louis, are self-explanatory. As the time available for the preparation of exhibits is now very short, intending exhibitors should take definite, individual action at the earliest possible moment. It is regrettable that none of the various photographic societies appealed to was able to respond to the invitation of the authorities.

Editor: THE PHOTO-MINIATURE, New York City. Dear Sir: Under date of July 20, 1903, invitations were extended by this department to seven Photographic Societies to name one member each of a proposed Committee of Review and Selection. The duties contemplated for this committee were to examine and grade photographs offered for exhibition.

Inasmuch as the majority of the societies have failed to respond to the invitation extended to them, it becomes necessary to change the programme, and new regulations have been formulated, a copy of which find

enclosed herewith.

I will be pleased to have you give publicity to these regulations in the interests of the photographic fraternity.

Very truly yours,

J. A. OCKERSON, Chief, Department of Liberal Arts.

Circular No. 9.

Regulations Governing the Admission of Photographs as Exhibits in the Universal Exposition to be held at St. Louis, April 30 to December 1, 1904.

That portion of circular dated July 29, 1903, relating to the admission of photographs, is hereby rescinded.

The following information is submitted for the guidance of photographers who contemplate entering photographs as exhibits in the Universal Exposition which

opens in St. Louis April 30, 1904.

First:—Applications for exhibit space should be made without delay on forms or blanks furnished by this Full information should be given as to the number, character and size of pictures to be submitted. together with a sketch showing proposed arrangement on walls, folding screens, or in albums.

Second: -All pictures offered must be mounted, matted and suitably framed, or otherwise properly prepared, for ready installation in the space devoted to photographs, the owner assuming all risk and expense of shipments to and from the Exposition, as well as the installation and care of same while on exhibition.

Third:—All photographs accepted as exhibits will be subject to review by an International Jury of Awards, composed of members from each of the several coun-

tries making photographic displays.

Fourth: -All photographs should be shipped so as to reach the Exposition not later than April 1, 1904. Shipping labels will be sent to accepted exhibitors on application to this Department.

The railways have granted free return of goods on payment of full rate to the Exposition, provided shipments are made in accordance with adopted regulations.

Fifth: - Freight and express charges and all charges appertaining to the transportation of photographs, must be fully prepaid at the point of shipment, and the goods delivered at the Liberal Arts Palace clear of all charges of every description incident to transportation.

Sixth: - Photographs offered as exhibits must be the individual work of the exhibitor named in the formal

application for space.

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Seventh: - There is no charge for exhibit space, and suitable screen walls will be constructed in the Liberal Arts Palace on which photographs may be hung.

Eighth: - Special adornment of space or extra lighting will be at the expense of the respective exhibitors

requiring same.

Ninth: - General Rules governing exhibits, their installation, the system of awards, shipping regulations, etc., will be furnished on application to this Department.

IOHN A. OCKERSON, Chief, Department of Liberal Arts.

So many anastigmats have been introduced during the last few years that many amateurs fail to appreciate the peculiar advantages justifying the appearance of the most recent objectives of this class. The task of discrimination is, indeed, not an easy one, and often nothing short of a series of practical tests in the camera will tell wherein one anastigmat may be more desirable than

another of the same class, for certain purposes.

This practical test we applied, a few weeks ago, to the new Homocentric lens introduced by Messrs. Ross, Limited, of London, and sold in this country by the Rochester Optical Company. The special purpose we had in view was the securing of negatives on 31/4 x 41/4 plates, with critical definition, for subsequent enlarge-The results obtained with the Homocentric at f/8 exceeded even our critical expectation and clearly surpassed results secured with another anastigmat of identical focal length and intensity. For small work intended for enlargement, such as hand-camera work in general, the Homocentric possesses definite advantages, due, apparently, to its almost perfect correction and the elimination of secondary spherical aberration.

A second and more exacting test was secured in a negative made by gaslight, the subject being a room decorated for Christmas festivities. Here the object in view was to obtain all possible detail without an unduly prolonged exposure. With a Cramer Trichromatic plate (red sensitive) and the Homocentric at its full aperture, f/6.3, an excellent negative was obtained with one hour's exposure. A second plate, exposed at the same time, with a rapid rectilinear working at f/8, gave a much under-exposed negative, and the definition fell away rapidly from the center of the plate. The practical conclusion here is, that for interiors, either daylight or by artificial light, the Homocentric ensures perfect definition at its full aperture and effects a large saving of time in the exposure.

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Few men in eastern photographic circles are so well known or so warmly admired as Mr. John Beeby, formerly librarian of the New York Camera Club, an amateur photographer of sturdy type, clever in technics and well able to hold his own in pictorial work. All this is of interest just now because Mr. Beeby has "pulled up stakes" and gone west, to locate on the Pacific coast. He goes accompanied by the good-will of innumerable friends who will miss his help and encouragement in the good work.

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The Daguerre Photo Club at the Hague intends to hold an international exhibition of artistic photography during the summer of 1904, with a view to give as completely as possible a review of modern art in

photography.

The following conditions are to be observed: (1) The photographs must be original, not reproductions. (2) They have to be framed. (3) Number, size and method of printing optional. (4) On the back of each print must be clearly written the title of the photograph, as well as the name and address of the sender, and also the method of printing and the worth of the print as valued by the sender (with regard to insurance). (5) The photographs must be addressed, carriage paid, to "de Regelings-commissie von den Eersten Internationalen Salon von Kunstfotografie, Pulchri Studio," 's-Gravenhage. To be duly accepted the photographs must reach the "Regeling-commissie" at the latest on June 1, 1904. (6) Admittance or refusal is decided



HYDRANGEAS Mathilde Weil



SPRINGTIME Mathilde Weil

by a jury (excepting invitation exhibits) composed of Messrs. H. W. Mesdag, painter, the Hague; Ign. Bispinck, president of the Amst. Photo Club, Amsterdam; Dr. H. Henneberg, art photographer, Vienna; F. Matthies Masuren, painter, Halle a-Saale, together with representatives of France and England, whose names will be published in the future. Prints not accepted will be returned to the sender at his cost. (7) A souvenir of the exhibition, in a form which has not yet been decided upon, will be presented to the exhibitors. (8) The committee is not responsible for loss of, or damage to the exhibits during their transport to and from the Hague. (9) The exhibition is to take place from June 12 to July 24, 1904, in the building of "Pulchri Studio," Lange Voorhout, the Hague. (10) After the close of the exhibition the photographs will be returned to the sender with the greatest possible diligence and at his cost. For further particulars apply to the secretary, Conradkade 63, the Hague.

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An invitation is extended to all amateur photographers who visit St. Louis during the time of the World's Fair to call at the club rooms of the Missouri Amateur Camera Club, at No. 1 N. Broadway, where the rules and regulations covering amateur photography at the World's Fair will be posted as issued. It is hoped that the club register will eventually contain the names of all the amateur photographers who visit the Exposition. The Missouri Amateur Camera Club holds regular monthly exhibitions and competitions of the members' work. The December competition was unusually interesting and instructive, containing many examples of thoroughly good work. The prizes in classes A, B and C were awarded respectively to Messrs. C. N. Pickering, F. S. Ives and W. A. Billings.

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In a recent letter, Rev. F. S. Dobbins, of Philadelphia, tells us that he has had made by the Bausch & Lomb Optical Company, an interchangeable cell for his telephoto attachment which brings the negative lens onehalf inch nearer the positive element, thus giving a far greater magnification than that obtained with the normal attachment. The print enclosed with Mr. Dobbins' letter gives ample demonstration of this magnification, which should be useful to the telephoto photographer. The magnification in the print before us is twenty-four fold, that is, the area is 576 times that obtained with

the positive only, from the same point.

Referring to a statement in the *Photo Era* wherein a writer claimed that the results obtained in portraiture with the telephoto attachment were indistinguishable from those made in the ordinary way, Mr. Dobbins sends us two prints from negatives of a bust of Shakespeare, one made with the telephoto attachment and the other made with an ordinary positive lens, in which there is evident a remarkable difference and improvement in the relative size and proportion of the different features. This was pointed out by Dallmeyer in his standard work on "Telephotography," and cannot seriously be controverted.

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Down Town Topics, a bright little paper published by the Obrig Camera Company as an advertisement, contains a suggestive paragraph on specializing. cialize in your hobbies, and particularly in photography. Do not commence to photograph silver birches, because you have heard a lecturer expatiate eloquently on the sylvan beauties of the forest, each season having its own charm, and then after a few trials, and, possibly, failures, you hear another man discourse on the irresistible enchantment of the sea in its varied moods, and as the first opportunity you rush off to the seaside, and produce very satisfactory results-for the plate-makers, not yourself. No! Sit down and think for yourself: which way do your inclinations lead you? In this case follow them; because in all probability your hobby of photography has been taken up as a relaxation and a method of getting rid of a superfluity of loose cash in a sensible fashion, and one in which you will have something to show after the money is spent. Having chosen a particular line, stick to it, read about it, and study it:

you will then produce results which I have no doubt will be interesting to others besides yourself; whereas if you attempt to run on too many lines you will accomplish nothing worth showing. Here are a few subjects which have by no means been exhausted: Natural history, flower studies, curios, rocks, clouds, costumes of various countries and cities, diversified methods of locomotion and traction, genre subjects, landscapes, men at all kinds of work, portraits at home, and last, but, perhaps, not least, natural color photography. In all you attempt, aim at good and pleasing composition, perfect technique, and the definition and printing process best suited for the delineation of the subject."

Postscript to Po. 22 The Photo-Miniature

Under this heading will be published occasional postscripts to earlier numbers of The Photo-Miniature series, giving new or additional information.—[EDITOR.]

In No. 22 of THE PHOTO-MINIATURE series, Mr. F. A. Waugh set forth the fundamentals of gum-bichromate printing in a clear and simple fashion, relating his personal experience with the process and emphasizing its remarkable possibilities as a medium of pictorial expression. As many of our readers know, the art of gum printing reached its perfection in Europe. For this reason the following account, from the pen of H. Vivian Yeo, will doubtless be appreciated as giving the European point of view. It is republished from the

pages of the Photographic Art Journal:

MATERIALS. 1. Gum.—Buy four ounces of lump gum arabic; dissolve it in eight ounces of distilled water in a wide-mouthed bottle; place the gum in a muslin bag, and drop the bag suspended from the neck of the bottle into the water so that the gum not resting on the bottom is quite covered with water; do not cork the bottle, but exclude the air with a piece of rubber tissue tied around the neck (a bit of disused mackintosh will do). The gum will dissolve thoroughly in three or four days, and works better when several months old. Have a good stock of gum always at hand; it becomes acidified with age, blends better, and keeps the pigment on the surface of the paper. You can always add some gum from a new stock to the older if the latter becomes too thin.

2. Papers.—In theory, any well-sized drawing-paper, of smooth or rough surface. according to subject and

taste, will work well. Having experimented with at least a dozen different papers, French and English, I have found the French "Allongé" paper the best. My advice is, experiment with any and every paper you can get hold of until you hit on the one which satisfies you.

3. Pigments.—Use water-color tubes; you will require Venetian red, lampblack, yellow ocher and indigo, and obtain the best lampblack. With these four colors you can produce warm and cold blacks, any shades of dark or light sepia or brown, and of red from "Bartolozzi" to the French "Sanguine." Keep no other colors; black, brown and red are enough for any monochromatist.

4. Brushes.—(a) For coating. Two flat hog-hair brushes, 2-inch for small prints, 6½ x 8½ and under, 4-inch for 8 x 10 and upward. Badger softeners are a snare and a delusion; spend no money on them; they cost from \$2 to \$5, and the hairs are for ever coming out, and hairs once adhering to the film of your coated sheet cannot be removed without injury to the film and the grain of the paper. The hog-hair brushes at first work streakily, but you can rub them down on a sheet of No. 1 or finer glass-paper. Remember a house-painter spends half an hour rubbing down his bristle brushes on a dashed wall so as to secure fine coatings without streaks. (b) For development. About one dozen mop camel brushes, with hair from the size of a billiard ball to that of a fine needle, and two or three

artists' oil brushes, ½ and ¼ inch.

5. Sensitizers.—One ounce bichromate of potash dissolved in ten ounces of water. Use this for coated sheets to be kept in calcium tubes and to be developed in a week or so. One ounce bichromate of ammonium and one ounce chromic acid, each dissolved separately in ten ounces of water. These latter mixed in equal parts print much more rapidly than bichromate of potash, but they cost five or six times as much, and sheets coated with them should be printed and developed on the same day. All three sensitizers keep in glass-stoppered bottles, even in bright daylight, for years.

For brush development, the half-and-half mixture of

better than bichromate of potash; they somehow make the film adhere more closely to the paper under the action of the brush.

We now come to this most important branch of our subject, which demands careful attention and deter-

mines our ultimate results.

Preparation of Coating Mixture. - Measure half an ounce of gum solution in a graduate, weigh from thirty to forty grains from a water-color tube, -you can guess at it by squeezing out an inch of color, which is equal to about twenty grains, or by squeezing out two inches, which equal about forty grains, but the amount of color (except in black) within ten grains or so makes little difference; it is better to have too much than too little, as there is always some waste. Place the color on a sheet of glass or ebonite, and work it well with an artist's palette-knife, adding a few drops of gum from time to time until you have thoroughly mixed the gum and paint, then return the mixture to the graduate, and add half an ounce of sensitizer; having stirred well, strain it through fine muslin into another graduate; for a few moments it will pass through in a thin stream, but shortly afterward will fall drop by drop; this will prove that your mixture is of the proper consistency for While the mixture is being filtered, prepare your paper, cutting it on the length an inch or so longer than your frame, and turn up this inch margin to enable you to handle the paper when coated.

Procure four small brass spring clips (such as men in offices use for pinning back their shirt cuffs) and a yard of half-inch elastic, cut the elastic in four, and attach the pieces to the clips, and pin one diagonally at each corner of a drawing-board (in size, eighteen inches by two feet) and attach the four corners of the paper to the clips. All papers stretch upon the application of moisture, and the tension of the elastic keeps them flat during coating. This plan is much better than pinning the paper to the board, for as the paper stretches the pins have to be removed, thus retarding the operation of

coating.

(b) Coating the Paper.—Stir the mixture well, and pour into a shallow dish as much as will cover a silver

dollar (repeating the operation with each sheet); then take it up with your brush and spread it as evenly and quickly as you can on the paper, working the film up and down horizontally, vertically and diagonally, using less brush pressure each time, and finally barely flicking the film until all streaks or unevennesses disappear, and then, before it has set, stop working, and hang the paper up to dry in a dark room on a line stretched across the room. This operation requires some manual dexterity; at first it is difficult, but soon, after repeated trials, you easily acquire the knack, and success or failure will depend on the thickness of your mixture and the brush manipulation. The amount of mixture I have given will easily coat from four to six sheets measuring ten by twelve inches, and remember your color should be deep, and your coating as thin as you can make it. The few drops of the mixture remaining over may be spread on paper, dried in the dark room, and used for the purpose of spotting out the prints when dry.

Coated sheets, in warm weather, will be bone-dry in less than two hours, and you can then print. Do not forget to wash out your brushes, graduates and dishes at once, as the mixture adhering to them, if long exposed to light, becomes hard and insoluble. You can coat in bright light, as the mixture is unaffected by light

when in the moist condition.

(c) Printing.—As regards exposure, so many conditions or factors have to be considered that it is quite impossible to lay down any general rule of universal application. The factors to be noted are strength of negative, color of pigment, the sensitizer used, actinic value of light, natural or brush development, etc.

Reds and browns have this advantage over blacks,—that you can, by your eye, always judge the right exposure. If your negative be a good printing one, using half-and-half chromic acid and bichromate of ammonium for brush development, on a clear sunny day (but not exposing to direct sunlight) fifteen to twenty minutes will suffice, and by examining the print in the frame you will observe that the shadows in red and brown assume a dark rusty appearance quite different in tone from the rest of the print, then the print is ready for

brush development. With black, however, there is no image visible, and you have to estimate exposure as best vou can. Some writers say that black takes half the time that red does; it is not my experience. Bichromate of potash used as sensitizer takes twice as long to print as the equal part mixture of chromic acid and bichromate of ammonium. The former has, however, this advantage over the latter, that you can store the papers sensitized with it in a calcium tube for future development, and they will keep as long as sensitized carbon, but if you leave them too long they will lose sensitiveness and will have to be re-coated, and some excellent effects and great depth of color can be obtained by re-coating with the same or another color. For instance, sheets coated six months previously with Venetian red, and kept in a calcium tube, when recoated with black yield a fine rich Vandyke brown or light sepia, according to the amount of black used in the process of re-coating.

(d) Mixture of Colors.—As compared with reds and browns, lampblack must be used in half quantities; for instance, if you take forty grains of red to coat four or five sheets in size ten by twelve inches, to coat the same number of sheets with lampblack twenty grains will

suffice.

A cold black is produced by mixing in small quantities of indigo with lampblack,—that is to say, you may add to twenty grains of lampblack from one to three grains of indigo, the more indigo you add the colder and bluer your black will become. Indigo is very powerful, and should be used sparingly. A warm black is produced by adding Venetian red to lampblack in the proportion of one grain of red to ten grains of black.

The best and richest black is obtained by adding to lampblack a very small quantity of yellow ocher; it somehow seems to give to lampblack a luster which it has not by itself, but remember to add the least touch of yellow ocher, as too much of it gives the black a

rusty appearance.

The best red, resembling what the French call "sanguine," can be obtained with Venetian red with a touch of crimson-lake, which takes away the bricky

color of Venetian red, but in this mixture, also, you must add a very small amount of crimson-lake, which is

very powerful.

Now as to browns. I distrust all the commercial browns, burnt and raw umber, Vandyke brown, etc. They worked so unsatisfactorily with me that I now get all the browns I require by mixing lampblack and Venetian red. Equal parts of these colors give too deep a brown. Two parts of Venetian red to one of lampblack gives a dark, rich brown, and by increasing the black or red to taste, you can get any tone of light or dark brown or sepia.

To see the exact color your mixtures will turn out, spread a little, thinly and thickly, on a sheet of white paper, dry at the fire, and when dry the exact color of

your print will be shown.

It is a golden rule to remember that the color must be as deep as you wish your deepest shadows to remain, and also to bear in mind when using two colors that you must spend a good deal of time in mixing them

thoroughly.

The Germans and some English writers advocate multiple printing and coating, but the French consider it quite unnecessary, and prove by their works that with single coating and printing the best and freshest effects can be produced. Gum printing, in all conscience, is difficult enough, without adding to it another terror and deterrent in the shape of multiple printing. I believe the French are right, and that a single coating, printing and development, if properly done, gives the greatest freshness, and brings out all the points of gum printing under the manipulation of capable and artistic hands.

DEVELOPMENT:—In the practical hints preceding we have mainly dealt with what I may call the mechanical portions of gum printing. In the following paragraphs, however, we approach what constitutes the great difficulty, and at the same time the great charm of the process, and that is, development. The development of gum prints is properly divisible into two different methods; the first I shall call natural or automatic development, and the second, brush or artistic develop-

ment.

It is important to get the idea well into your mind, and to always remember that the keynote for success in gum printing is proper exposure, and also to bear in mind that you must regulate your exposures by keeping in view which of the two methods of development you intend to adopt. For automatic or natural development you should give short exposures, from twenty minutes to half-an-hour on a clear bright day, but not

facing direct sunlight.

NATURAL, OR AUTOMATIC DEVELOPMENT: -Now, how is it possible? It simply means you print lightly, and float your print, face downward, on the surface of water in a deep dish, and the print from which the pigment melts off by degrees develops by itself, producing an exact replica of the negative. Sometimes this automatic development, which must be carefully examined from time to time, takes from one to six hours, or longer in proportion to the length of exposure you have given, - the shorter the exposure the quicker the development, and the longer the exposure the more protracted the development becomes. Leave your automatically developed prints to dry flat on sheets of blotting paper with the film upward, because if hung up the pigment is liable to run and degrade your high lights or melt off altogether.

I recommend beginners, especially those who have had no training in a school of art, and have not studied composition, form, light, shade and tone values under competent art teachers, to commence with automatic They will observe the perfection or development. imperfection of their negatives pictorially, and with a couple of months' study and practice will feel how their prints can be improved, both by the suppression of unnecessary detail and the accentuation or lowering of contrasts, and it is an accepted fact with gum and all kindred processes that under-exposure gives softness and over-exposure harshness of contrast. Thus, having attained so much in automatic development, the ardent gummist, with higher instincts and artistic aspirations, will not rest satisfied with it, but when his eyes have become opened to better things he will abandon automatic development and attack brush development, which

will afford him the latitude of simplifying, suppressing or wiping out what is undesirable in his prints, of making his deepest shadows luminous or less dense, and of accentuating or subduing his high lights in a manner not possible in other printing process. In other words, with brush development the fullest scope is afforded to the worker for personal intervention, which if accompanied by taste and some art knowledge, lends a charm and interest to photographic work and raises it from the regions of handicraft and mechanism to those of individuality and art.

BRUSH DEVELOPMENT: — The leading French, American and German gum workers seem to manipulate brush development on quite different lines, and each nationality adopts a method and style of its own. It is therefore quite futile to lay down any fixed rules or principles for brush development, and those gathered from one's own personal experience may not suit others, so each worker has to be a law unto himself, and work

out his own gum salvation.

Judging by their results for myself, I incline to the French school, which I think is the best, in the preservation of half-tones, in the freshness and beauty of pigment, in depth of coloring, and the hundred and one nuances all of which are such potent elements in a good

gum print.

Major Puyo, one of the most eminent gum workers in France, advises beginners, before commencing to coat their own papers, to train their apprentice hands on commercially prepared gum papers, so as to give a good foundation in gum printing. He enumerates these papers (without transfer), I, Artigue; 2, Fresson; 3, Farinaud, and 4, a German paper called Höchheimer.

Nos. 1 and 2 have a gelatine, and Nos. 3 and 4 a

mixed gum and gelatine basis.

I have tried two of them, and found, on account of the difficulty of estimating exposure, they are harder to develop with brush than self-prepared papers. No doubt, you will gain from working them a considerable amount of experience, but as these papers prepared with a gelatine foundation all require hot water for development, you will be somewhat put out upon discovering that papers coated by yourself can be easily developed and in a much shorter time with cold water. Personally, I advise gum aspirants to plunge in medias res, and to learn to coat their own papers from the beginning, because to work the commercially prepared papers involves quite as much labor as to prepare one's own, and it only postpones the arrival at that most desirable goal. Papers prepared by oneself, moreover, cost about one-tenth of the trade gum papers, and as no gum printer can in every case command results, and as it may be necessary to make at least twenty prints of one negative before obtaining the artistic effect desired, expense may be a matter for some consideration.

First make a good print in any medium from your original negative, and, having studied it well, make up your mind what you intend to suppress or accentuate; then, when commencing development, pin up the print in front of you as a guide, or, better still, study your print so fully that you have a keen mental vision of what you are aiming at for your ultimate result, and you will find the task not nearly so difficult as that which the distinguished conductor, Richter, has set himself in conducting Beethoven's Symphonies without

a score.

Remember that for brush development you have to sensitize with equal parts of chromic acid and bichromate of ammonium, and that you have to give a rather prolonged exposure of about an hour or so on a sunny

day.

When your print has been sufficiently exposed, place it face downward in a deep dish of cold water, allowing it to remain there for five minutes or more until the image has partially appeared; then place it in the water face upward, and test the margins lightly with a brush to see how soft or resisting the film is, and when it commences to melt under the friction of the brush place it in another dish with water half an inch in depth, and commence gently to press the brush downward with a dabbing motion, and do not drag the brush across the film, which causes streaks which cannot afterward be obliterated. If it be a landscape, leave the sky till the last, and attack the foreground or darkest shadows, and go

over all the print (save the sky) with a uniform pressure. You will then observe the film disintegrating and becoming sensibly lighter and melting under the pressure of the brush; resist the temptation to work at first much at the high lights or brightest spots, but remove the pigment very carefully and uniformly, having regard to the different tone values of your subject.

If you are developing a figure study or portrait, commence with the drapery, accessories (if any) and background, and leave the face for the last, for if you begin with the face you may make it too high for the surroundings, and remember you can always remove, but cannot add to the pigment which has been rubbed off by the friction of the brush; do not get excited and hurry matters up, but keep before your mind the motto "festina lente," for anxiety and haste spoil more prints than anything else.

If, at this stage, you find the pigment melts too easily, you may be able to save the print by stopping development, removing the print from the water and drying in

the dark.

This disappointment is caused by under-exposure, but you may cure the defect by placing the print when quite dry in cold water again, and re-commencing with the brush as before. You will then find that the film is much harder, and does not yield so easily to the brush. It is a good plan to take the print out of the water frequently, to place it on a sheet of glass or ferrotype plate, set it standing up and examine it carefully from a distance of six or eight feet, just in the same way as a painter retires to a distance from his canvas on the easel to estimate the various values, and half closes his eyes to see how his work is progressing; this will enable you prints.

If you find the values are not right inter se, you can withdraw the print from the water, place it on a sheet of glass, and, by the friction of a clean and dry brush locally applied, raise or accentuate the tone as required so as to preserve the harmony of your values. This is a delicate operation and requires extreme care, and it is for this purpose I advised you in a previous number to

have at hand a good stock of brushes, varying in size, softness and hardness, and if no such brush be available for the moment, a piece of blotting-paper twisted into a point or a paper stump such as is used in charcoal work will be an excellent substitute. When finishing touches of this kind are required, never place the print in water again, but if a bright part be patchy and unequal when the brush has left it, a small stream of water from a sponge carefully directed or a glass syringe will bring it to a uniform tone.

It sometimes happens that, when your print is finished to your satisfaction, traces of the yellow stain of bichromate still remain enclosed in the film. It generally dissolves out in the water, but if it be still perceptible you can remove it altogether by placing the print (which has been thoroughly dried in full light) in a bath of bisulphite of soda (one ounce to twenty of water) for a few minutes, then rinse in cold water. Be careful to leave your print for a very short time in the bisulphite bath, as it has a powerful effect on the film and may alter all the values if the print be left in too long.

In conclusion, I advise you to read all that has been written on gum printing, and, to facilitate your researches, I append a list of works on the subject for study or consultation, which I know will be of great

service to the beginner.

Beware, however, of nostrums, and formulæ, which have worked for some people, and which you may find to be useless; do not trust them too much, but rather try and strike out original lines for yourself. Remember this process is still in its infancy, has undiscovered possibilities, and that the field for original research is for all as yet wide, and traversed by few, and assiduous practice makes discoveries which will help to bring it to maturity. "What man has done man can do," and sometimes even better than those who have preceded him,—and especially in a subject wrapt in empiricism, and for which the most prominent workers of the present day prophesy a great and permanent future.

H. VIVIAN YEO.

Books on the Gum Process

"Photo-aquatint or Gum-bichromate Process."

Maskell & Demachy.

"The Gum-bichromate Process." Article by James Packham. Second edition of "The Barnet Book."
"Gum-bichromate Printing," by F. A. Waugh.

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"The Gum-bichromate Process," by W. J. Warren.
"Modern Printing Processes," by Henry G. Abbott. "The Gum-bichromate Process," by Henry Wenzel, Jr. "American Annual of Photography," 1901.
"The Photogram," January, February and March,
1903. "The Gum Process," by R. Demachy.

Books and Prints

"Photographic Portraiture," from the pictorialist point of view, is the subject of an interesting article in the February issue of The Booklovers' Magazine, from the pen of Mr. C. Yarnall Abbott, of Philadelphia. The article is illustrated with selected examples of portraiture by Gertrude Käsebier, Eva Watson-Schütze, Eduard J. Steichen, Mathilde Weil and others. We would love these pictorialists more if they did not so persistently decry the other man's work, i. e., the product of the old-school professional photographer. When all has been said and done, the portraiture of both old and new schools speaks best for itself, and there is an old saw about comparisons which is oft forgotten.

The February issue of Wilson's Photographic Magazine contains a reprint, from The Photographic Journal of December, of "The Theory of the Mariotype and Ozotype Processes" by Thomas Manly, the inventor of the Ozotype process. It will be recalled that, when Ozotype first appeared, it was said to be a re-invention of Marion's earlier Process known as Mariotype (1873). In his paper Mr. Manly clearly shows the essential difference between the two processes, and his account forms an extremely interesting contribution to the literature of the subject.

Under the title The Practical Photographer Library Series, Messrs. Hodder and Stoughton, London, have rejuvenated The Practical Photographer, formerly published by Percy Lund & Co. In scope, character and price the P. P. L. S. resembles THE PHOTO-MINIATURE, each number dealing with one subject, the size

of the magazine being reduced to 5½ x 8½ inches. The principal topic in each issue of the P. P. L. S., however, is dealt with by many writers instead of being cast in the form of a monograph by one writer, as in these pages. Of the four numbers thus far received, No. 1 deals with "Bromide Printing"; No. 2 with "Bromide Enlarging"; No. 3 with "Lantern Slides," and No. 4 with "Trimming, Mounting, Titling and Framing Photographs." The series is issued under the general editorship of the Rev. F. C. Lambert, and has already achieved great popularity on the other side of the water. We learn that arrangements are being made for the publication of the magazine in America.

1

We hear, with sincere regret, that The Photographic Art Journal, published at Leicester, England, has been discontinued, owing to its failure to win the support essential to its success.

2

We are all familiar with the fascination of the unfulfilled desire! For years the scribe desired to possess the Christmas number of Photography, and, year after year, missed it by some mishap or another. It is a special issue, readily obtainable for a shilling in London, but apparently not sent to Photography subscribers or "exchanges," and it invariably sells "out of print" as soon as published. Well, this year fortune came the scribe's way in the shape of the Christmas numbers for 1902 and 1903, inscribed with a word of good will from the editor, Mr. R. Child Bayley. Since their arrival they have given much pleasure to all who have seen them, and the discriminating reader who can enjoy carefully selected pictures wedded to interesting text will do well to make sure of Photography Christmas number, 1904, when it appears next December. [Iliffe & Son. London; 50 cents, postpaid.]

A.

The amateur who is interested in portraiture of the better sort should not miss the admirable collection pub-

lished in the Metropolitan Magazine for February. The twenty examples there reproduced are apparently selections from the Loan Exhibition held at the American Art Galleries, New York, last December. Though poor as reproductions, they are extremely suggestive of the qualities most desired in good portraiture, and, from this point of view, should afford the discerning portraitist pleasure and encouragement.

9

"Photographic Portraiture as a Profession for Young Gentlewomen," by Miss Alice Hughes, forms the concluding chapter of "Some Arts and Crafts," the fourth yolume of The Woman's Library, just published.

[E. P. Dutton & Co., New York.]

Miss Hughes is the daughter of a well-known English painter and was led to take up photographic portraiture as a profession by the oft-repeated requests of her father's sitters for photographic reproductions of his paintings, as preferable to the ordinary studio portrait. Later the making of portraits from life was added to the reproduction of paintings, a studio being built off the drawing-room of her father's house. In her advice and suggestions to young gentlewomen who would fain be portraitists, Miss Hughes is inclined to be pessimistic, and the gentle reader is likely to lay the book aside with a sense of profound discouragement. Let it be here recorded, therefore, that all the American gentlewomen who have entered upon photographic portraiture as a serious pursuit have achieved a notable degree of success.

4

A series of twelve illustrated papers on "Mounting the Exhibition Print," by Frederick H. Evans, is being published in *The Photogram*. The scheme of the series includes not only the theory of mounting prints in harmonious and tasteful fashion, but practical demonstration of how to do it. Thus each issue of *The Photogram* for 1904 will contain a reproduction of one of Mr. Evans' photographs, printed in colored ink on toned paper. This print is to be removed from the magazine

and mounted on the cover paper used for the covers of the issue and surrounded by a second mount made of a different cover paper, as specified in the instructions given by Mr. Evans, which instructions are illustrated with a reproduction of the mounted and finished print. Those who would learn how to use the beautiful mounting papers made by the Niagara Paper Mills, which are at Lockport, N. Y. (vide advertisement herein) will find in The Photogram for 1904. "a royal road to learning" [The Photogram, Limited, London. \$1.25 per year. New York: Spon & Chamberlain.]



The Catalogue of the Fourth Chicago Photographic Salon, which closed its doors January 24, is an attractive piece of work, profusely illustrated with reproductions which speak well for the quality of the exhibits. Special interest attaches to this Salon in that it represents the work of pictorialists outside of the membership of the Photo-Secession, which body did not exhibit. Louis A. Lamb furnishes the preface to the Catalogue and makes therein some interesting statements, as witness this extract: "Finally, the photograph needs no concealment of its parentage—its father the lens, its mother the bromide plate, its quickening spirit the soul of the camera worker." This may be all right, but why does Mr. Lamb leave us so completely in the dark as to the relationship of the developer?



There is announced from London a book which seriously threatens the supremacy so long enjoyed by the beloved Thomas Harrison Cummings, of Boston, among American photographic journalists in the matter of poetical quotation for picture titles, etc. The promised work is labeled "Picture Titles for Painters and Photographers," a collection of choice quotations from the poetry and prose of Great Britain and America. By L. A. Baldry. Price, three shillings and sixpence. Hereafter it would appear, the would-be Salonite seeking a couplet wherewith to identify the thing his soul has quickened into life (as Mr. Lamb puts it above),

will no longer pore over the editorial pages of the *Photo-Era*, but will simply turn to Section —, Chapter — and Paragraph —, as directed by the index of Mr. Baldry's invaluable compilation, and find at once the desired quotation. "Oh, why should the spirit of mortal be proud?"

.4

Developing: Its Use and Abuse: A Text-book for Professionals and Advanced Amateurs. By Henry G. Abbott. 53 pages; 4½ x 5½; paper covers, 25 cents.

Chicago: Hazlitt & Walker.

Those who favor the older and tentative system of development, as against the newer automatic methods, such as the factorial and developing - machine modes, will find much of interest in this little book. Mr. Abbott believes that the developer should be skilfully compounded and modified in manipulation to suit the characteristics of the plate used, the exposure and the particular effects desired in the negative. In his theories he closely follows the well-known French authority, Albert Londe, but the formulæ and practical instructions throughout are chiefly from American sources. The various brands of plates in the market are characterized, their relative speeds compared, and almost every conceivable variation of subject and circumstance is provided for by special and particular instruction.

.38

Svenska Fotograf - Samfundets Tidskrift (Swedish Professional Photographers'. Journal) is a new monthly magazine published at Stockholm, under the editorship of C. E. Fleetwood. The first number gives evidence of ability and enterprise, and deserves success. Among the illustrations we note several by Mr. Ferdinand Flodin, of Stockholm, formerly a successful professional at Worcester. Mass.

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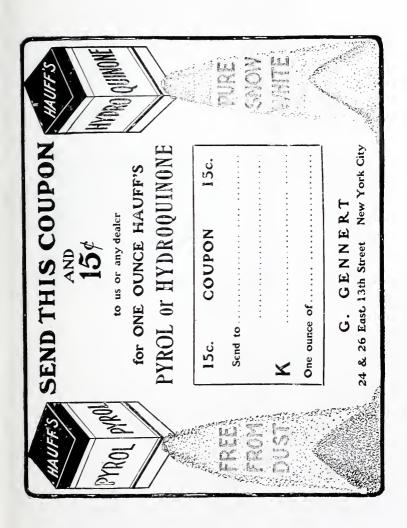
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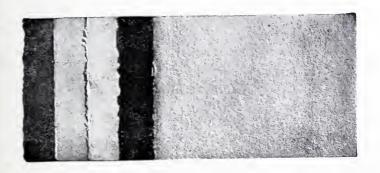




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followed after fixing by reduction or intensification.

Owing to the wide latitude allowed in exposure by our films, perfect negatives result from development for a certain length of time in a fixed strength of developer if the exposure has been anywhere near correct. And to correctly expose is not difficult as the beginner imagines, there being a latitude of fully five points. For instance, if the correct exposure for a given subject were three seconds, any exposure of from one to five seconds would give a perfect negative. Whether "snap-shot" or "time-exposure" makes no difference to the machine, and it handles both kinds of exposure on the same strip of film with perfect results. Indeed, the superiority of machine-developed negatives is so marked that a battery of Kodak Developing Machine, operated by a water-motor, as shown in the illustration, now does our work, and does it better than could even the skilled and careful operators whom we have always employed. If the machine can give better average results than can be obtained by men who have done nothing for years except develop negatives, the amateur can certainly draw but one conclusion; that he must use it - not endeavor to compete with it.

ROCHESTER, N. Y.

IN DETAIL

For normal results, develop six minutes, using a developer of

one-half the strength formerly recommended.

To accomplish this, simply dissolve the regular machine powders in double the regular quantity of water, then take the required quantity for your particular machine (one-half of your solution) and develop six minutes at 65 degrees Fahr.

(NOTE: The remaining solution may be used for the next film, provided you begin development of same within 15 minutes from the time the

solution was mixed.)

In case you make up your own solutions, use the following formulæ:

BROWNIE MACHINE

7 grains Pyro.

40 grains Sulphite of Soda, anhydrous

28 grains Carbonate of Soda, anhydrous 8 ounces Water. Temperature, 65 degrees Fahr.

STYLE A MACHINE

14 grains Pyro

80 grains Sulphite of Soda, anhydrous

55 grains Carbonate of Soda, anhydrous

16 ounces Water. Temperature, 65 degrees Fabr.

STYLE E MACHINE

21 grains Pyro

120 grains Sulphite of Soda, anhydrous

83 grains Carbonate of Soda, anhydrous 24 ounces Water. Temperature, 65 degrees Fahr.

STYLE H MACHINE

35 grains Pyro

35 grains Fylo 2000 grains Sulphite of Soda, anhydrous 138 grains Carbonate of Soda, anhydrous 40 ounces Water. Temperature, 65 degrees Fahr.

RINSING.—Development being completed, run enough cold water into machine to just cover apron; give a dozen turns to handle; pour off water; refill as before; again give a dozen turns to handle; pour off water; remove film from machine and place quickly in the (previously prepared) Fixing Bath.

(NOTE. The film can be handled in a light that would prove safe with

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vents stains; but a plain hypo bath may be used. Have plenty of fixing solution in a deep tray or earthen dish, so as to fully cover the film, using four ounces of hypo to each pint of water. Fix for two or three minutes after all the "milky" look has disappeared from negatives.

If you use plain hypo with N. C. Film, follow fixing by soaking for five minutes in a saturated solution of common alum to

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remove stains. If Kodak Acid Fixing powder is used, this is unnecessary.

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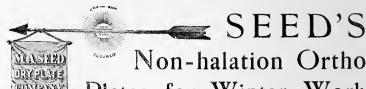
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THE PHOTO-MINIATURE

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WINTER PHOTOGRAPHY



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ANNOUNCEMENT

The handbook to "The Optical Lantern," announced to appear in this issue of The Photo-Miniature, has been abandoned for the present. Although prepared by a man who has spent his life with the lantern—as announced,—the Monograph, as supplied, was not "fit to print."

In its place we present herein a practical guide to "Winter Photography," giving the actual experiences of three workers who know what they are talking about. We believe the little book will be found as helpful as it is timely—and well worth the price.

The January number, now in press, will offer an illustrated monograph on

OUTDOOR PORTRAITURE

written and illustrated by one who has made a successful specialty of this class of work—which deserves more attention from both amateurs and professionals. Novel in its point of view, avoiding the conventional method, simple and direct in style, it is one of the most interesting books included in this series.

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- Modern Lenses, April, 1899 The Pose in Portraiture Hand-Camera Work
- Photography Outdoors Stereoscopic Photography
- 6. Orthochromatic Photography
- Platinotype Processes 7· 8. Photography at Home
- Lantern Slides g. The "Blue Print," etc.
- 10. 11. Developers and Development
- Retouching Negatives and Prints 12.
- Photographing Flowers and Trees 13. 14. Street Photography
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- 16. Bromide Printing and Enlarging I7. The Carbon Process 18.
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- Trimming, Mounting and Framing Albumen and Plain Paper Printing 21. Gum-Bichromate Printing 22.
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 34. More About Development (Pyro, Metol. (etc)
- 35. Enlarging Negatives 36. Lens Facts and Helps 37. Film Photography
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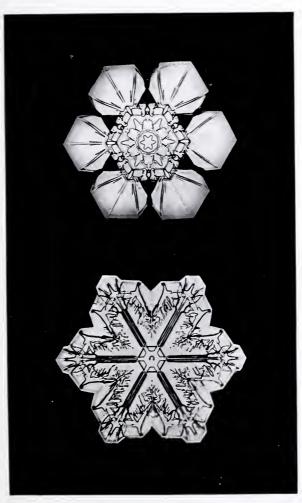
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Photo-Miniature

Magazine of Photographic Information JOHN

Volume V

DECEMBER, 1903

Number 57

WINTER PHOTOGRAPHY

Many amateur photographers lay aside their cameras after the leaves have fallen in the autumn and never think of taking them out until the leaves come again in the spring; the stock dealers regard the winter months as between-seasons, advertising cameras and supplies at bargain rates; and even the photographic periodicals have dropped into the habit of looking upon winter as a season of anticipation rather than of present opportunity. As a rule, these last fill their pages from December until March with a variety of articles dealing mainly with work which is peculiar to the summer months, and not until about April do they wake up and begin to realize that "something has been doing." Then, when the snow is all gone and it is too late to do anything, they begin to tell us what we should have been doing when we had the chance.

Before getting right down to what is essentially and exclusively winter work, - snow photography, - and assuming for the moment that there is no snow on the ground outside, and that the gentle reader is pining away and possibly losing interest for want of some way of utilizing his hobby, let us see briefly if we cannot devise some truly photographic work with which he can pass away his spare time during the winter months. I think we will see before we get through that the subject of winter photography in general has been pretty well covered in THE PHOTO-MINIATURE series, though

possibly we did not realize it before.

Winter is essentially the season for giving lantern-slide exhibitions for the Slide Making benefit of the home folks, or friends who may drop in to spend an evening from time to time. Attractive as one's collection of photographs may be, they are never half so attractive to our friends in general as through the medium of the lantern. In summer it would take a very considerate friend indeed to stay cooped up in a hot room in the dark and either patiently or enthusiastically view a hundred or so slides thrown on the screen. But in winter all is different, and even a fairly good exhibition of lantern-slides is looked upon as a boon by both family and friends. In summer, too, there is too much other work to do-exposing, developing and printing—to think about making lantern-slides. And a reducing camera or other apparatus is by no means necessary in order to get up a fairly representative collection of slides. A great many negatives up to 5 x 7 inches or even 6½ x 8½ inches have little bits of beauty in them which our lantern-slide mask of 3 x 3 inches or even smaller will just fit. In such cases the slides can be made by contact. Where the negatives are 4 x 5 inches or smaller, either plate or film, the slide by contact is just the thing. If the reader of this particular copy of PHOTO-MINIATURE has never tried slide-making, let him or her, as the case may be, take the writer's advice, buy a box of lantern-slide plates, a few cover-glasses, masks and binding strips, at a total outlay of about fifty cents, and try it. Put them through a friend's or the club's lantern, and maybe a lantern of your own will come later. Full instructions for this delightful branch of work will be found in THE PHOTO-MINIATURE No. 9: Lantern Slides.

Photographing Flowers

Flowers

Summer was of course the time for photographing flowers, as there was such a great variety of them to be had for the asking or the picking. But, again, there was so much else to do, and possibly we made no attempt to photograph the flowers. Well, it is delightful work, and, while not as easy as it might be, is still not so hard as to be at all formidable. Try the next bunch of roses that finds its way into the house during the winter; in

fact, a dozen bought for the purpose will give back their cost in pleasure. With THE PHOTO-MINIATURE No. 13: Photographing Flowers and Trees at hand, it will be impossible to go far wrong in the good work.

Last summer we made some good Intensification negatives, but the prints are not quite and Reduction all they might be. We did not stay to doctor them at the time, as we had to make more negatives and prints. Let us pick out those which seem to have most of promise in them and see what we can do with two or three of them. pictures, you know, are seldom made from negatives just as they come from the drying rack. In fact, it is often said that the negatives from which some of the Secessionists make their exhibition pictures would give the professional commercial photographer the delirium tremens, or something equally disagreeable. They say that where they are not locally reduced they are locally intensified, so the rest of us certainly need not hesitate to doctor ours a little. THE PHOTO-MINIATURE No. 15: Intensification and Reduction will tell us exactly how to do it. No. 32: Defects in Negatives may also help us toward better results. Maybe some of the negatives would be better if enlarged, the tendency of our exhibitions nowadays being toward larger frames than formerly. In this event, No. 35: Enlarging Negatives will be a great help. A platinotype or carbon print from an enlarged negative, by the way, will be far more satisfying than a bromide enlargement, no matter how good the latter may be; but if an enlargement on bromide paper is preferred, that branch of work will be found covered in No. 16 of this series. And speaking of carbon reminds us that winter is preëminently the season for the carbon worker. In summer we have the greatest amount of trouble drying and keeping our tissue; the sensitizing solution insists on getting too warm; in fact, summer is generally regarded as a bad season for carbon work, except by the professional who manages to have everything to suit conditions. using a stronger sensitizer than that recommended for summer work, we can make our carbon tissue print much faster even than platinotype, so the weakness of the the printing light in winter need not deter us from making prints if we use this medium. THE PHOTO-MINIATURE No. 17: The Carbon Process tells all about it.

Platinotype Modifications Possibly some of our platinotype modifications underprinted, but not thrown away. Now is a good time to experiment, and if they can be utilized at all, No. 40: Platinotype Modifications will tell how to do it.

Copying Probably a large majority of amateur photographers have never tried copying.

The soft, diffused light of a gray winter day is just the opportunity for work of this kind. Just what to copy is often the question, but this question is

fully answered in No. 41: Copying Methods.

It is hardly more than necessary to write the word in order to suggest the possibilities of this field of work, which the disgruntled photographer with nothing to do has probably overlooked. No. 29: Flashlight Photography gives a number of methods simply and comprehensively covering the whole subject.

The same reasons which make winter days good for copying make them good Interiors for many classes of interior work, though the exposure is ordinarily somewhat longer than in summer. With snow on the ground, however, the time of exposure is cut down considerably and the room as a rule much more evenly illuminated than in summer. The flashlight can also be used as an auxiliary source of light. A very interesting task for a winter day under suitable conditions would be the making of a portfolio of prints of interior views of one's home, a task which is not at all likely to be undertaken in summer, even assuming that the hangings, etc., were the same, which is not often the case. No. 30: Photographing Interiors contains explicit instructions for all classes of interior work.

Home portraiture is another interestportraiture ing field of winter work. While the light is weaker, it is more diffused and better for portraiture as a rule than the strong summer light, though, by placing the sitter nearer the window and ju-

diciously using proper screens, the exposure can be cut down considerably. No. 2: The Pose in Portraiture, No. 8: Photography at Home, and No. 19: Photographing Children, tell pretty much all there is to tell about home portraiture. But even if one does not care to go in for regular home portraiture, the making of silhouettes will furnish lots of amusement for either a day or evening at home in winter. No trouble about posing, lighting or accessories. Merely, if by daylight, a sheet a few feet in front of a window, the sitter a foot or so in front of that, and the camera in line with both; a comparatively short exposure (all other windows being darkened) and development for contrast, and the thing is done. If at night, a flash cartridge takes the place of the window. and gives even better results, as the contrasts are stronger and there is less trouble in developing.

Before leaving the subject of opportunities for work during the winter Information months, it may be well to suggest the advisability of indexing one's negatives and magazines. Both accumulate so rapidly that it is almost impossible to keep up with them unless some regular system is adopted. Such a system, if adopted in the beginning. or brought up to date at any later period, will be of the greatest possible assistance to the amateur photographer. and there is no better time for doing this work than during the long winter evenings. Of all the systems which have come to the writer's attention, the cardindex is by all odds the simplest and most satisfactory. Negatives can be given a number as they are made, and then stored away in envelopes or boxes bearing those numbers. A card is devoted to each negative or set of negatives, and full data placed thereon, including the number given the negative. The cards are then filed away, according to subject, in an alphabetical index. If the negative is wanted, we look for the card, find the number on it, and then get the negative. If we merely wish to refer to the data, we have it on the card and need not take out the negative or its envelope. dexing magazines the same general system is followed. articles or special points of interest being noted on cards according to subjects, the place of reference being given, and the cards being filed away under an alphabetical index. These outfits are quite cheap, a sample outfit being usually procurable on advantageous terms from any of the many card-index advertisers in the magazines.

Outdoor
Work

Having now disposed in a general
way of indoor photographic work during
the winter months, we can take up the
subject of outdoor work, where we will be a little more

explicit in our remarks.

The reaction toward outdoor life in America during the past few years is unquestionably attributable largely to photography, illustrations of nature-subjects in the various magazines having aroused in many persons an interest in things out-of-doors. The camera itself, in other cases, has created a strong personal interest and enhanced capacity for the enjoyment of nature in her varying moods, by taking the camerist abroad into the woods and fields in search of material for the making of pictures. This interest in things out-of-doors is confined largely, however, to those phases of nature which exist during the more temperate months, and many users of the camera have no conception of the beauties of a winter landscape, or of the opportunities opened up for the expression of artistic feeling of the highest kind.

An open view of freshly fallen snow, broken up here and there by tracks and taken even at midday, or particularly with the morning or afternoon sun casting long shadows across the field of view, is a pretty thing, just as an open landscape in summer would be. But the real sentiment of winter is to be found under more common conditions. We cannot photograph the winter winds as they rush across the brown stubble-field, whistle through the branches of the leafless trees and howl under the eaves of the lonely house in the country on cold and blustery evenings in December. But we can reproduce many of the conditions, and our picture can be made to express the sentiment of the winter winds; when we look at it we can be made to feel like turning up the collar of our coat and pulling on our mits, and can with but a slight stretch of fancy look within the lonely little cottage and see gathered about

the roaring wood fire in the old chimney-place the father of the house with his paper, the mother at her knitting, and the children popping corn or cracking nuts on the hearth—and all this without a sign of any snow on the ground outside. In this monograph, however, we shall confine ourselves more particularly to the subject of snow photography, the subject of landscape photography in general having been well covered in the series.

Winter is primarily and preëminently not the time for experimenting in the field. Cold fingers and frosted feet are not conducive to artistic feeling, and before going afield with our camera we should know exactly what we are after and know how we are going to get it.

Do not think that you must make a

Forethought picture or even carry a camera every time you go out, but be on the lookout at all times for promising picture material. Remember that composition of line alone does not make the picture, but that the masses of light and shade and atmospheric conditions must all combine in perfect harmony with the main lines of the view to render a perfect work of art. If you see a good composition which seems to have in it the elements of a picture, note carefully whether the other conditions are in harmony. If not, wait until they are. The snow and the sun are mighty transformers of nature in the winter season, and a little patient waiting will in nearly every case bring the desired result. Make test exposures now and then for the purpose of getting the best results when the picture is finally taken, these being most conveniently and economically made with a small camera. Then, when the time is ripe, take out your larger camera and make the final exposure, it being always well if one has a really good opportunity before him, to make several duplicate exposures, developing one in the usual way, and in the others correcting in development the defects of the first.

Owing to the difficulties and personal discomforts under which the winter photographer works, it follows that our apparatus in the first place should be simple in the

extreme. The mere setting up and focusing of the camera is a hardship when our fingers are down to the freezing point and the metal parts of the camera way below. For snow scenes pure and simple during the lighter hours of the day, the ordinary, cheap, fixedfocus hand-camera is admirably adapted, and any one having such an instrument cannot go far astray in making snapshots under the conditions stated. on this class of camera usually works at f/16 and the shutter at about $\frac{1}{20}$ of a second, both very good data for the ordinary winter photograph with films. If the sun is shining brightly and it is at the beginning or toward the end of winter, the next smaller stop may frequently be used to advantage in open views. As it may be well at this point to dispose finally of the amateur who merely presses the button and leaves the rest to the stock-dealer, let us urge that such a camerist insist on the aforesaid stock-dealer developing his films with less contrasts than they ordinarily give them. The stock-dealer, as a rule, has been educated down to the point of developing all films with the maximum contrasts, that being the demand of the public in general. In consequence, stock-house-developed winter scenes print out perfectly white as to the snow and jet black as to the trees, figures, etc. This is all wrong, inartistic in the extreme, and absolutely untruthful to nature, as any one will see who takes the trouble to look out-of-doors on a winter day. The work of the kodak roll-film developing machine is admirable in this respect, and when properly used the machine yields film-negatives with a good range of values and quite true to nature as respects the snow.

Camera and Lens

The stand-camera for winter work should be simple in all its manipulations, although the various adjustments should be provided for. The Rochester View, the Century or any other of the ordinary view-cameras are excellently adapted to this work, but, after having used such for a number of years, the writer personally prefers a combined hand- and stand-camera which closes up with the lens in place, and has room inside for several plateholders, the Premo Sr., for instance, others of the

same type being equally good. The idea should be to carry as little and to have as few things to lay down in

the snow as possible.

The camera, of whatever kind it may be, should be provided with a reversible back and long bellows. An expensive lens is not at all necessary, the ordinary rectilinear lens answering every purpose except when small plates are made with the view to enlarging, in which case the more modern anastigmat with its critical definition will be found more satisfactory. Frequently it will be found that the back combination of the lens can be used to advantage, so a convertible lens of that type really gives one the benefit of two lenses. In fact, many rectilinears and anastigmats are now made so as to work with three focal lengths, one at the normal focal length in combination, another with the front lens in place, and another with the rear. For general work, if we are confined to one lens capable of being worked at only a single focal length, a medium-angle lens will be found most useful, to wit, a lens in which the focal length is approximately equal to the longest dimension of the plate. This enables us to get any desired view from a comparatively near point of view, and if the perspective is exaggerated we can trim down from the four sides and get in smaller form exactly the same perspective we would have had in larger size had a narrow-angle lens been used.

The shutter is apt to make trouble in winter when used out-of-doors, owing, no doubt, to the contraction of the metal parts from the cold. For instance, I have an iris diaphragm shutter which works pretty well in the house, but when taken out-of-doors on a cold day requires to be adjusted at 50 second in order to give an exposure of about 5 second. In fact, very little dependence can be placed in any shutter in cold weather, and it is always advisable for the worker to accustom himself to the shutter speeds indoors by looking through the lens and working the shutter at various speeds, so that when he gets out-of-doors he can tell whether it is working properly or anywhere near properly. For these reasons it is advisable to use a lens-cap where conditions per-

mit rather than to rely on the shutter. The writer has had no experience with the focal-plane shutters in winter work, but in classes of work where there are moving figures in the view, and quick exposures with the maximum illumination of the plate are required, shutters of this class would seem to be a necessity. Mr. Arthur Hewitt has done some beautiful work in this line for the illustrated magazines, and uses a focal-plane shutter altogether.

The focusing-cloth should be arranged Accessories so that it can be fastened to the camera, as the wind has a most provoking way of trifling with the dignity of the photographer under a focusing-cloth on a winter day, and these things are never agreeable or conducive to that calm and patience with which we should set about making a work of art. Better still is one of the Eureka focusing-hoods to be found on the market at the cost of a focusing-cloth, and which fit the camera exactly, having little elastic loops which slip over the ears and hold

the eyepiece in place while focusing.

A good steady tripod should be provided, for winter winds are often strong, and steadiness is particularly desirable when working with extended bellows, or when making long exposures. A Mellen tripod-stay, which may be slipped into the pocket or camera-case when not in use, and which greatly steadies the camera when attached to the tripod, is a desirable addition to one's

outfit.

A little thought should be given to the effects of cold and damp weather upon fine apparatus. The camera should be protected from dampness and falling snow as far as possible, and, after having been used under such conditions, should be thoroughly overhauled and carefully dried before being put away. The metal parts and the bellows should be gone over with a soft rag on which a little oil has been dropped. Lenses, particularly those composed of a great number of separate elements, should never be suddenly exposed to extremes of heat and cold. If the camera is kept in a fairly cool room and the lens wrapped in a focusing-cloth, no trouble will be experienced. Any condensation of

moisture on the lens, caused by the warmth of the hands in adjusting the shutter or otherwise, should be carefully wiped off before exposure, and the hands should be kept away from the lens as far as possible. The lens should not be brought from the cold directly into a warm room, as moisture will be condensed on its various surfaces both outside and within the barrel, and this tends to injure the lens in several ways.

For the very best results in snow pic-Plates and tures, a nonhalation plate is almost a ne-Films cessity, though a great many workers get good results by the use of the ordinary unbacked plates. Reason would seem to demand the use of backed or double-coated plates for this class of work, and practical experience has shown that they have many points of advantage over the unbacked plate. It is a well-recognized fact that one of the reasons why the sky prints out so extremely white in many landscape pictures is because the strong light from the sky penetrates the sensitive film and is reflected into it again from the back of the plate, thus giving practically a double exposure to the sky, known as halation. This halation is plainly apparent in those views where branches of trees, chimneys, etc., project into the sky space. As a matter of course, it is present to the same extent where there are no such branches or chimneys, but we do not always realize it. For the same reason the snow portion of a view in a winter landscape receives a similar double exposure, while the light from the trees and other dark objects in the view is not strong enough to penetrate the film and be reflected back as aforesaid, thereby resulting in undue contrasts. The difficulties in the way of overcoming the natural contrasts are so great in the first place that we should welcome the opportunity afforded by double-coated or backed plates to avoid this action of light reflected from the back of the plate, and hence it follows that we should use such plates whenever possible. Our own preference is for one of the doublecoated orthochromatic plates recently placed upon the market by several of the leading plate manufacturers. With such plates one is able to get negatives with sufficient detail in the darker parts of the picture and still

preserve all the delicate gradations of tone and shadow in the snow itself. Where the double-coated plate of the desired kind is not readily available, backing can be used to advantage, that known as the "E. W. N." being one of the best and most easily applied and removed. A dozen plate, can be backed with this medium in as many minutes, and, if necessary, loaded directly into the plate-holders without drying, though this is not advisable, as it tends to make the holders dusty. This backing can be removed instantly with a moist sponge. For rapid exposures, say 25 of a second or under, backing is really not necessary, though it is better to make a practice of using either double-coated or backed plates and therefore be prepared for all emergencies. With films there is practically no halation such as that above referred to, and hence they are in that respect admirably adapted to snow photography.

Both advanced workers and writers
Ortho Plates generally agree that a corrected or orthochromatic plate is necessary for the best

snow work, and some years ago the writer suggested that this might be because of the large amount of brilliant blue light which is reflected from the snow, especially the shadows. This is not so much noticeable to the naked eye, but it is seen the moment we get our head under the focusing-cloth when the sun is shining brightly on the snow. The corrected plates being less sensitive to the blue than the ordinary plate, it would follow that they would yield better values; and such in

practice is found to be the case.

In view of the fact that the writer has on several occasions met really good and experienced workers who did not understand the meaning of the term "corrected" plate, it is deemed well to explain that the socalled "ordinary" plate is not properly sensitive to the various colors of the spectrum, being supersensitive to blue, indigo and violet, thus making these colors appear too light, and comparatively insensitive to green, yellow, orange and red, thus making these colors appear too dark. Certain manufacturers have within the past few years undertaken to correct this defect in certain of their plates, and these are what is meant by the term

"corrected" plates, sometimes called isochromatic or orthochromatic, such as the Cramer Instantaneous, Medium and Slow Isochromatic, the Seed and Carbutt Orthochromatic, and the like. Unless specified as corrected by some such term, plates are considered as uncorrected, such as the Cramer Crown, Banner, the Seed 26, Seed 27 and the like; but in point of fact, experience with many of these so-called "ordinary" plates, and particularly with several of the brands of films on the market, would seem to indicate that some attempt has been made to make them more sensitive to yellow and less sensitive to blue than they formerly were.

While references hereinafter made to exposures are in connection with the fast plates, it will be found that better results can ordinarily be obtained with plates of the slower emulsions, these giving a greater latitude in exposure, and in the case of corrected plates, usually

giving better tone and color values.

The color screen is often both desirable and necessary with orthochromatic Ray Screen plates, and where subjects of varying natures are to be photographed an assortment of such screens may be necessary. The method of their manufacture and adjustment to particular plates is fully set forth in THE PHOTO-MINIATURE No. 6: Orthochromatic Photography, and in No. 45: More About Orthochromatic Photography. It must be remembered that, in order to render relative tones with exact fidelity to nature, the screen must be accurately adjusted in depth of color to the particular plate in use, as a screen designed for one plate may be entirely unsuitable for another. The great advantage of the color screen, apart from the fact that it renders the plate properly sensitive to all or nearly all the colors of the spectrum, is that with one sufficiently deep in color we are enabled to vastly overexpose a certain portion of the plate in order to get proper values in a darker part of the view, and still preserve the gradations in the over-exposed portions, which would otherwise be rendered flat from over-exposure and consequently far from pleasing. And, while perfect adjustment of screen to plate is advisable, it is by no means necessary in all cases, as some improvement in snow work will arise from the use of any screen at all with any corrected plate, provided always that the screen is not too dark, and the proper additional exposure be given; the theory being that by reducing everything in the view to a comparatively non-actinic color. the range of the natural contrasts is diminished, the loss in actinic value of the whole being compensated for by the additional exposure. For this reason the writer uses a light screen in nearly all his snow work, and finds that it helps considerably with even an uncorrected plate. A very light screen will not more than double the exposure with either kind of plate and tends to preserve the contrasts in broken snow. This is contrary to established doctrine with reference to the uncorrected plate, as it is usually thought that any color screen adds very greatly to the necessary exposure with an uncorrected plate; but the writer has made hundreds of exposures in this way heretofore and made twenty consecutive exposures a few days ago especially to test this statement, and finds it so in practice, though with a darker screen the exposure on the uncorrected plate will run up to as much as fifty times that given with the same screen on a corrected plate.

A rather dark screen will be found necessary in all cases where there are clouds in the view, and a comparatively long exposure is necessary on account of dark

objects in the foreground.

Self-preservation being the first law Personal of nature, it would hardly seem neces-Comfort sary in a work on winter photography to give instructions on the subject of personal comfort, but we may be pardoned if we say a few words on that subject. For one thing, patent-leather shoes and winter photography do not go hand in hand. The point of view is not often to be found in the well-trodden path, and we should therefore wear heavy water-proof shoes high enough to lace around the bottom of the trousers. arctics with leggings fastening down over them, or high rubber boots, in any case wearing heavy woollen stockings. We can then plunge into snow-drifts to our heart's content and come home with fairly warm and dry feet. For the hands we prefer heavy mittens, which can readily

be slipped on and off. In setting the shutter or adjusting or removing the plate-holder, they may be removed for the moment, and immediately slipped on again. It will be found that in this way the hands can be kept very comfortable even throughout an extended ramble with the camera. The rest of the body should of course be comfortably clad, as for any other outdoor exercise in cold weather. If possible the camera-case should contain the tripod and should have a strap attached to it for throwing over the shoulder, leaving the hands for the overcoat pockets. Equipped as suggested, the amateur photographer need have little fear of the hardships attending winter photography, though otherwise he will find a very little of it to go a very long way.

It has been already stated that afield Experiments in winter is not the time or the place for experimental work. And right here let us make the suggestion that in no field of work does a little judicious experimental work pay so richly as in snow photography. For instance, we may and will hereafter give the reader certain figures as to the correct exposures under certain conditions. He may rely on those figures and go out and expose a dozen large plates, only to find after development that our figures were away off. Why is it? Simply because we are dealing with different factors. I may develop my plates with a certain developer, modifying it in such a way that the negative will have the proper contrasts when it reaches a certain point in density. You may use the same developer, but handle it differently. Again, you may have one idea of the proper density of a negative and I may have another. The consequence is that we get altogether different results. As an instance of this, a certain worker who makes as fine snow pictures as I ever saw told me that he got his results by using a corrected plate, No. 128 stop and from forty to sixty seconds exposure. I promptly tried it and found that got my best results with from 6 to 10 seconds exposure under the same conditions. Heaven and he alone know what developer he uses or how he uses it. And so it may be with the figures which we give hereafter. A dozen 4 x 5-inch plates of any brand cost very little, and by setting up the camera on a bit of typical landscape and withdrawing the slide an inch at a time, opening and closing the shutter each time, and thereby giving cumulative exposures successively, that dozen plates is good for just sixty test exposures. stance, if we withdraw the slide one inch and give 1 second exposure and repeat this four times, the strip first exposed will have received one second exposure and the one last exposed \frac{1}{5} second exposure, the intermediate strips having received $\frac{4}{5}$, $\frac{3}{5}$ and $\frac{2}{5}$ seconds exposure respectively. The plate is then watched in development and the strip selected which seems to come up most nearly as you would have it. Develop for that strip, fix the plate and note carefully the results. The strip on either side of the one selected will help you tell whether the exposure has been correct, or if wrong, how far wrong. Have you a back yard? If so, the next time the snow falls pick out a part of it where you have both sunlight and shadow, snow and darker objects, and expose a plate or two in the way suggested. Backyard snow may not be teeming with sentiment, but the opportunity for experiment is there in abundance, and you have all the while the happy privilege of running into the house and warming your fingers over the kitchen range.

We need more of such experimenting in photography. The average amateur seems to have an idea that it would be a profanation of sacred instruments to set up his camera on anything short of a glorious landscape. He does the latter and profanes the landscape through his ignorance of technique. A dozen plates exposed in the back yard according to some fixed and well-thoughtout plan will give more real instruction than a hundred exposed in the field and developed to meet errors in exposure. The writer nearly always figures these test exposures out the night before, puts them down on cards and exposes accordingly, filing the cards away

with the negatives.

Branches of Winter Work with snow. Actual outdoor winter photography be divided into two classes, landscape without snow, and landscape The former has been treated broadly in



OVER THE HILL Osborne I. Yellott Chicago Salon, 1902



DRAWERS OF WATER Osborne I. Yellott

THE PHOTO-MINIATURE No. 25: Landscape Photography, and additional light has been thrown on the subject by No. 54: Outdoor Exposures. As branches of this work we might also refer to the photography of individual trees in winter, a prolific field full of interest, covered by No. 13: Photographing Flowers and Trees, and also to the photographing of clouds for use in our winter landscapes, this subject being sufficiently covered by No. 24: Photographing Clouds. In this monograph we shall be obliged to confine our attention more particularly to snow photography, though that subject has been touched upon in a general way by several of the monographs already referred to. It is, however, a mistake to think of outdoor winter photography only in connection with snow on the ground. Winter furnishes us with many subjects in which snow has no part, or at best is but secondary in its importance,—the bare branches of the trees, with their delicate tracery of twigs against the glow of the western sky when the sun has hidden itself behind a low bank of clouds toward evening on a winter day, the wind-swept rushes against the dark background of the stream, as well as the wooded hillside in spring when small patches of snow but accentuate the thought that winter is passing. These are but suggestions of the variety of material which presents itself to us during the months between fall and summer

Snow is a magic transformer, bringing forth, many times, beauty, where before all was ugliness. The stretches of field and hill, the sloping and rounded banks of the stream, the trunks of the trees, beautiful though they all are when clothed in the green of summer or the many colors of the autumn months, take on a peculiar beauty and charm when covered with the soft white mantle of winter. Even the dweller of the crowded city is not denied the beauties of winter; in fact, in town the gain in opportunities seems equally as great as in the country. Snow quickly loses its beauty in the city, and he who would seize some of the picture-making chances must not linger, but should be alive to his opportunities as quickly as the snow commences to fall.

Number your winter pictures by Selection and quality rather than quantity, for it is Composition better to spend the whole winter obtaining half a dozen pictures which satisfy you in every particular than to make dozens of prints which are simply commonplace subjects, photographed without any thought of desirability of selection. Strive to picture nature in some of her rarer moods. Any one can make a snapshot on a winter day and get something that looks like snow because it doesn't look like anything else. But be serious in your work, and strive constantly to make something which shall need no excuse for its existence.

The early morning and late afternoon are those best suited for the making of snow pictures. The foreground is often the greatest point of interest in snow-covered landscapes, and the long shadows which prevail when the sun is low serve to give character and interest to what would otherwise be but a meaningless expanse of white. In some of the most successful and beautiful snow pictures which have been made, the shadows and gradations on the surface of the snow have formed the motif and furnished the interest, as note the exquisite bit by Mr. Gleason, reproduced among our illustrations.

Probably in no other kind of landscape is there such an opportunity for variety of composition and arrangement, but it should be remembered that simplicity gives strength and character to a picture. Amid such a profusion of material, selection must play an important part. Stretches of foreground broken by the shadows of trees, stone walks or fences partly covered with snow or ice, the rounded and curving banks of a brook will often furnish in themselves material for a picture or give the needed touch to the composition.

Do not try to crowd too much into one picture, and be sure that what is included is harmonious. Try and see what may be done with such simple material as a few stalks of goldenrod projecting above the snow. Newly fallen snow often requires to be broken up in some way for pictorial effect, and the practice of walking once or twice across the foreground is often resorted

to. One should determine carefully before doing this just where the tracks should come, to give the desired lines in the picture, as a mistake is not easily corrected. Possibly there is a dark stone or trunk of a fallen tree in the middle distance which is a disturbing note in the composition. A little snow taken up from behind them can be used to cover such objects, or, if this be not possible, they may often be blocked out in the negative. Possibly a patch of dark is needed here or there. The snow at that point can be scraped away. Possibly a bush or a few straggling briers add to the composition at another point. These can be easily transplanted by being stuck in the snow where needed. Any number of such little dodges will occur to one in actual experience, and all can be utilized at times to great advantage.

Do not be afraid to point the lens toward the sun. By carefully shading the lens from the direct rays of light, it is possible to work almost directly against the light. Long and effective shadows may often be had in this way. If tree trunks or other dark objects form part of the composition, and true pictorial effect is desired, they should be rendered in their proper tone, and appear in the picture with their correct relative values, not as perfectly black objects without quality or meaning. By working when the light is somewhat weak, as it is in the early morning or late afternoon, and giving sufficient exposure and careful development, but little trouble should be experienced in keeping the extremes of tone within the limits of agreeable contrast.

For convenience in dealing intelli-

Classification of Subject shall divide outdoor snow photography into three general classes or divisions, taking up the practical questions of exposure and development under each head. We find that snow scenes can be well divided into three classes.

Class I. When high tones prevail and there are no

dark objects to give extremes of contrast.

Class II. Where the high tones of the snow are brought into direct contrast with dark objects, such as tree trunks or patches of bare ground in the foreground of the picture.

Class III. Snow pictures with figures, where a short exposure is required because of the nature of the subject.

This class embraces a picture, for class I instance, showing an expanse of snow relieved only by the delicate shadows upon the surface and by trees or buildings in the distance. Also pictures made during a snowfall, when all objects are rendered more or less indistinct and of a light tone by intervening particles of falling and drifting snow.

Exposure:
Class I

Miews included in this class are ordinarily lacking in strong contrasts, and it is imperative that the most should be made of whatever contrasts there may be, otherwise the picture will appear flat and lacking in character. The rule being that short exposures increase contrasts while long exposures overcome them, it follows that the exposure in work of this character should err if at all on

the side of under-exposure.

Assuming that our view is composed of a stretch of open field, trees in the distance, sky and clouds in the view, sun shining, and delicate gradations of light and shade in the foreground and middle distance, but no dark objects, we have a view that would be difficult to under-expose at midday, and using a fast plate, such as Seed 27 or Cramer Inst. Iso. without color screen and No. 8 (f II) stop, we could safely give from $\frac{1}{100}$ to $\frac{1}{50}$ second exposure and depend upon normal development to give us the proper contrasts. At four o'clock in the afternoon or eight in the morning in midwinter we could safely increase this to $\frac{1}{25}$ second.

Or if the sun should not be shining, but the light is bright and the chief beauty of the scene lies in the delicate gradations of light and shade on the unbroken snow, we could safely make the exposure $\frac{1}{2\pi}$ second at

midday with the plate and stop stated.

After three o'clock in December, four in January and five in February and March, the light falls off so rapidly that it is impossible to give any data as to exposures that would really be serviceable. The tables given in No. 54: Outdoor Exposures come nearer meeting this problem than anything heretofore published, and by

making the necessary allowances for atmospheric conditions, nature of the subject, plate, screen, etc., they will be found to meet every ordinary requirement, always remembering, however, that the exposures for this particular class of work are to be shorter than those indicated for ordinary snow scenes.

Where, however, the view, while open as a whole, nevertheless contains dark objects or masses in the foreground or middle distances, these exposures will have to be greatly increased, and it would be safer to con-

sider the subject as coming under Class II.

Negatives of this class may safely re-Development: ceive rather vigorous development,-Class I that is, normal solutions should be employed, and the plate carried up to a fairly good printing density. This method gives character to the high lights and a pleasing richness to the slight shadows that are present on the surface of the snow. We should remember, though, that even with the sun falling directly on unbroken snow either from behind or one side, the snow is never perfectly white, as we will see if we kick up a pile of it and take a position where the light from the broken snow is reflected back to the eye. We should, therefore, be careful that the snow in such scenes should not be carried far enough on the negative to print out perfectly blank paper. For this class of work a pyro developer is excellent and should be used in the normal proportions. It is best to use the one recommended by the maker of the plate in use. If the reader does not use a pyro developer, let him use his usual developer at its ordinary strength. As rodinal will be hereafter recommended for development of negatives in Class II, and the reader may wish one developer to serve for all classes of winter work, we recommend for work where strong contrasts are desired the following: Rodinal, ¼ ounce; water, 5 ounces; bromide of potash, 10 per cent solution, 2 to 5 drops.

In all winter development, great care must be taken to keep the developing solutions at a temperature of from 65° to 70° Fahr. Cold developing solutions yield weak, flat negatives of little or no character. Development ought, therefore, to be carried on in a fairly warm room, or, if that be impossible, the graduate containing the solution should be placed in a vessel of hot water from time to time in order to maintain the temperature

of the developer at the proper point.

We are well aware that many advanced workers get most pleasing effects in this class of work by giving much longer exposures than those we have suggested. They develop in dilute solutions, or, what is the equivalent, solutions weak in the reducing agent, keeping the plate thin, so that it can by no possibility print out black in any particular part. But this method is only for those who are skilled in the processes of development and printing, and the method we have given will be found to meet the requirements of the ordinary amateur who uses his negatives with a variety of printing papers and wants good results on all.

Exposure:
Class II

Class II

This class embraces what is known as average landscape, when dark objects or masses are in the foreground and the middle distance is fairly open, the snow in this class of subjects being usually broken up by tracks or otherwise.

The principal characteristics of such objects are the strong contrasts between the snow and the dark objects in the view. The problem before the photographer is by exposure and development combined to preserve at one and the same time the delicate detail in the snow, the contrasts between the snow as a whole and the darker objects, and the delicate detail in such darker objects—a problem by no means easy of solution.

As to how to treat this problem, different writers and workers differ most radically, but the general consensus of opinion is that full exposure must be long enough to give full detail in the darker objects in the view, and the contrasts must be obtained largely in the development. This last proposition, however, is by no means as simple in practice as it looks on paper, since every one knows that if we over-expose a white object full of delicate gradations of light and shade, we will lose most of such delicate gradations unless we use a strongly restrained developer or carry development to an abnormal length, and if we do that in the case of a snow scene the restrainer will hold back our detail in the

shadows and we will be where we started. Therefore, it follows that we must so time our exposure as to avoid as far as possible the necessity of making corrections in development; in other words, we must do all we can in every given case by exposure, leaving the rest to development.

In the first place, we should use double-coated or backed plates, for the reasons before stated, this being one step toward keeping down undue contrasts.

As stated, various workers differ radically in their ideas of the proper exposure for snow scenes. instance, referring to the winter competition in the Photo Beacon, of May, 1900, we find two apparently equally well-exposed pictures of average landscape with snow taken at about the same hour in February (II A. M.), one on a Cramer Med. Iso. plate with Poco color-screen in five seconds, and the other on a Seed Nonhalation plate with an equivalent exposure of 15 second,—a tremendous latitude, to be sure. the third prize picture was made in the same month on a Wüstner plate with an equivalent exposure of 100 second, all on the basis of the No. 8 (f/11) stop. So, after making all possible allowance for differences in plate, speeds, effect of screen, etc., we see that good snow pictures of Class II can be taken in from $\frac{1}{100}$ to I second with the No. 8 stop with a fast plate on a bright day in February. But either the data in some of these cases are incorrect or the greatest care was used in development, and it would hardly be safe for the ordinary worker to accept them as standards.

The ordinary reader will not want to leave too much to development; and the question therefore is, What are the allowable exposures for the average snow scene

with normal development?

It happens that the writer does not employ normal development with snow pictures, and therefore when he undertook to prepare this monograph, he was unable to answer the above very important question. True, he might have hedged a bit by advising some other kind of development, in which event he could have given the figures furnished by the *Photo Beacon* contest above referred to, or any other figures that might have

come to mind. But he knew that whatever development or method he might recommend, the reader would go ahead using his own normal developer and methods, and the question was therefore still before him for an answer.

The writer, therefore, determined to make a few exposures to find out. He first made out a list of his intended exposures and then waited for a good fall of snow and a sunny day. He then picked out a bit of a view made up of a path with broken snow shoveled up on either side, two rows of dark tree trunks running alongside it, a road beyond in the middle distance and a yellow house, evergreens, and some more trees in the The sun during the course of the experiments ranged from behind the camera to almost directly in front of it, the day was early in January and the hour from 8 A. M. to 4 P. M. He had arranged for ninetysix exposures, ranging from $\frac{1}{100}$ second to 10 seconds. on the basis of the No. 8 (f.11) stop. The developer was to be Seed's A B C pyro developer, used at normal strength and at a temperature of 65° Fahr. It was to be carried from three to seven minutes, which was to be the only variation. Seed 27 and Cramer Inst. Iso. plates were to receive identical exposures in all cases and to be developed together in one tray. Some of the plates were to be backed and some left unbacked, in several cases half of a single plate being backed and the other half left unbacked. A light vellow color screen was to be used at times.

The writer thought this a pretty fair test on the subject of exposures on an average landscape, and the pro-

gram came off without a hitch.

As a result, he is prepared to announce that any one working under the conditions stated, and with the plates and stop mentioned, will get fairly good results by exposures ranging anywhere from 25 to 5 second, the former in the middle of the day and where great detail in the snow is desired, and the latter earlier or later (before 8 A. M. and after 4 P. M.) or where greater detail is desired in the darker objects and the snow is not so important; the best all-round exposure, however, for the conditions stated being about 10 second with the

Dr. L. M. Hemburger

WINTER A. A. Gleason

No. 8 stop and fast plate, this holding from 8 A. M. to

4 P. M. in January.

With the light color screen the allowable exposures under identically the same conditions extended between $\frac{1}{20}$ and I second approximately, but the best results were obtained by exposures of about $\frac{1}{6}$ second. By best results in these cases is meant negatives which showed fairly good contrasts in the snow and some detail in the shadows, the whole negative printing up fairly well.

It was found that the Cramer Inst. Iso. plate, when developed in the same tray with a Seed 27 receiving the same exposure, invariably came up and finished development ahead of the Seed plate; but in every such case the contrasts were greater with the Cramer plate at every stage of development. With the Cramer plate the snow appeared to better advantage, the trees, however, being unduly dark, while with the Seed plate the trees were in a better relative tone, but the snow appeared rather flat. The light yellow screen had an equal retarding effect on both plates and resulted in negatives of a better class than when the exposures were made without it. With two short exposures the contrasts were of course unduly great, but with the longer exposure the detail in the snow stood up better than when the screen was not used.

For exposures under different conditions or at different hours of the day, it will be well to consult No. 54, on Outdoor Exposures or No. 14: Street Photography, remembering, however, that scenes in this class may frequently require longer exposures than those ordinarily given for snow scenes, this depending upon the

amount of dark in the view.

The above figures are intended for the reader who develops negatives of this class in the normal developer, a method which is bound to be adopted by a great many workers, notwithstanding the fact that the methods hereinafter described are far more likely to give good results.

While exposures made as above on either the ordinary or the corrected plate and developed as stated will give fairly good results, the writer, after an experience in snow photography covering quite a number of years,

feels prepared to abide by the conclusion he reached several winters back, that the best way to get on the plate and preserve in the negative all the contrasts, detail and delicate gradations in an average winter landscape is to reduce everything in the view to a rather deep yellow by using a fairly strong color screen, such as the Bausch and Lomb ray-filter with normal bichromate of potash solution, give a fairly full exposure on a corrected plate and develop in a dilute developer. preferably metol or rodinal to which has been added just enough bromide of potash to prevent chemical fog. Exposures made and developed in this way on a backed Cramer Med. Iso. plate (which is preferred to the Inst. Iso.) with the No. 8 (f/11) stop, will vary from $\frac{1}{26}$ second for a fairly open landscape at midday to a second for the same view at sunset, or several seconds with large dark masses in view. For an average landscape such as above described, 1/5 second at midday will be found ample with the No. 8 stop. At midday, with large dark masses in the foreground, the exposure may be as much as \frac{1}{2} second with the No. 8 stop. From one hour to fifteen minutes before sunset \frac{1}{5} second with the No. 8 stop will suffice for a fairly open view with no very dark objects in the immediate foreground. With the Inst. Iso, the exposure must be almost as long as with the Med. Iso, to get the same effects in the shadows, as the former plate has not the same latitude in exposure, and tends to harsher contrasts. The fact that these exposures are no longer than those given above for faster plates and a lighter color screen, would seem to mark the difference between a normal pyro and a dilute metal developer.

Development: As already pretty clearly indicated, the development of negatives in this class should be carried on in a dilute solution, this being equivalent to a developer weak in reducer, and a simpler process. The writer prefers for the purpose a metol hydroquinone developer made up about as follows: Metol, 30 grs.; hydroquinone, 30 grs. dissolved in water, 20 oz.; then add sulphite of soda, (cryst.) 1 oz. and carbonate of soda, (cryst.) 3 oz. For development of snow negatives in Class II, take of this

2 ounces and add 4 ounces of water where there are no very heavy masses of dark in the foreground and 8 ounces of water where there are. Before use add I drop of a 10 per cent solution of potassium bromide to each ounce of solution. If plates developed in this way show too much flatness after rather prolonged development, the dilute solution may be poured off and the plate finished in a developer of normal strength, 2 ounces of stock solution and 2 ounces of water. Mr. A. Gleason, who is collaborating in this monograph, agrees with the writer of these particular lines as to the general principles of development stated, and suggests as an alternative developer for negatives in Class II a solution of rodinal, one part, to 40 or 50 parts of water.

A pyro developer can be used, but if so should be diluted several times beyond the normal, and a fresh solution used every few minutes until develop-

ment is completed.

This method can be used to great advantage in snow work, but instead of Local Development the usual method of applying the strong solution to the shadows, development should be allowed to proceed in a dilute developer until the detail is well up in the shadows, and the strong developer then applied to the snow where needed until it reaches its proper density. The developer can best be applied by the use of a wad of absorbent cotton soaked in strong developer (normal strength) and then rubbed over the negative while the same is under the surface of the dilute developer. This renders the local work under better control and prevents sharp lines of demarcation, streaks and the like.

Tank
Development saving of time, being merely dilute development carried to the extreme, and tending to bring up the shadows and high lights evenly regardless of the amount that the latter may have been over-exposed. This method of development, which is rapidly coming in vogue with the more advanced amateurs for nearly all subjects, but is especially useful in work of this class, has been fully explained in No. 11: Developers and

Development and No. 34: More About Development. will be found that in many cases where resort is had to tank development, it may be well to take the plate from the tank before development is complete, and finish it in a stronger solution. In some cases the writer has gotten the desired result in very difficult cases by taking the plate from the tank before development is completed, washing it thoroughly, and then intensifying with Agfa, a good intensifier for the purpose. For instance, a plate which had been exposed in four sections of $\frac{1}{5}$, 1, 10 and 40 seconds, a ratio of 1:200, was treated in this way and printed out more evenly than one which was exposed similarly with a ratio of 1:10 and developed in the normal developer, thus proving the possibilities of the method in overcoming differences in exposure such as occur in many snow scenes. Development in Class II should never be carried too far, as over-development accentuates contrasts and this was what was to be avoided. In fact, if we should be so unfortunate as to find after beginning development that the exposure was too short to reach the detail in the shadows, we can largely compensate for this by stopping development while the plate is thin, in which event the shadows will print out gray instead of black, thus giving a semblance of detail at any rate. In fact, even though we get full detail in the shadows and then develop too far, the detail will be lost in the printing.

Snow pictures with figures, where a Exposure: short exposure is required because of the Class III nature of the subject. This class embraces street scenes in city and town, skating and sleighing scenes and the like. Exposures of this class are best made with a focal plane shutter, with which the maximum illumination is obtained with the fastest working of the shutter, although the ordinary shutter can be used where the other is not available. The exposure should be as long as the motion of objects in the view will permit, and if this is too short for a full exposure, the correction must be made in development. This subject has been well covered in a general way by No. 3: Hand-Camera Work, No. 4: Photography Outdoors, No. 14: Street Photography, and a great deal of

useful information which has more or less bearing on the subject can be found in No. 39: Photographing Animals and No. 51: Press Photography.

Skating subjects alone open up a delightful and comparatively untried field to the amateur with a focalplane shutter. The pastime in itself is a graceful one

and lends itself readily to artistic compositions.

Speaking of winter pictures in the city, Mr. Gleason says, "The city amateur has many opportunities for making effective pictures during the winter months. One should always be on the outlook for possible subjects, making a note in one's mind of any promising material, for snow soon loses its beauty and charm in the city, and what is to be done should be accomplished while the conditions are favorable. The city is a particularly good field for the making of effective snowstorm pictures. The hurrying figures in the foreground against the flying snow, the lines of the buildings growing less and less distinct in the distance, all combined with the atmospheric effect which photography so truly renders,—all these things serve to give a charm to the successful street picture. One has but to study the possibilities of such subjects as the street sweepers at work, the hurried life and figures at a winter fire, and children at play in the park, to realize that good subjects are always to be had. Do not be afraid to get out during stormy weather in search of such subjects, for you will soon forget any slight discomfort, so interested will you become in what is going on about you.

"City parks have been a favorite place for making night pictures of snow by the aid of the electric lights. Such work, while somewhat difficult, is very interesting. While the making of such pictures requires considerable study, a few words on the subject may not come amiss.

"Nonhalation orthochromatic plates should be used, for great contrasts of light and shade are sure to exist. The camera should be set up so that none of the electric lights will come into the field of view. The corner of a building or the trunk of a tree may often be taken advantage of to shield the lens from the direct rays of any light.

"Of course the exposure required is somewhat long when making night pictures of this kind. Development should be for detail rather than contrast, in fact one is liable to get more contrast than is desirable."

Adding to what Mr. Gleason has to say on the subject, the writer would say that in his very limited experience in this line with an ordinary hand-camera with iris diaphragm shutter, street scenes in winter are scarcely ever effective with an exposure of less than $\frac{1}{25}$ second with No. 8 stop, and the nearer they can be made to reach $\frac{1}{5}$ second, even with a good light and fast plate, the better they are apt to be. In such cases, of course, a larger stop than No. 8 should be used and the

shutter speed regulated accordingly.

In night scenes, such as those spoken of by Mr. Gleason, it will be found that five minutes' exposure with the No. 8 stop and fast plate will give very good results so far as the snow under or near an electric light is concerned. Where light is reflected from the snow into the darker shadows of the picture, an exposure of twenty minutes with the same stop will be found to give a fair amount of detail. For the most satisfactory work in this line, however, it is best to be equipped with a faster lens. A lens working at No. 4 (f/8), such as the ordinary rapid rectilinear found on most hand-cameras, will require four times the exposure required by one of the modern lenses working at f/4, the ratio of exposure being the ratio of the squares of the f values of the several lenses compared.

Development:
Class III
Class where there are dark objects and brightly lighted snow or ice in the view is practically the same as that required in Class II, the problem being the same, so no additional remarks on the

subject are required.

In photographing falling snow, which should only be attempted when the snow is falling slowly and in large flakes, it is necessary that there should be a dark background of buildings, or the like, in order that the falling snow should stand out clearly in individual flakes. To avoid blurred streaks caused by flakes falling too near the lens,

it is necessary to place the camera under an awning, porch or shed, so that there is a clear space of from six to eight feet between the lens and the nearest falling snow. In an emergency an umbrella can be held over and as far in front of the lens as possible. To get the most realistic effects a rapid plate should be used and the exposure should be from one-tenth to one-fiftieth of a second with the lens wide open, or at most stopped down to f/11, the length of exposure depending upon the time of day, atmospheric conditions and character of objects in the view. The lens should be focused on some object in the foreground, distant objects being thus thrown out of focus and adding to the general effectiveness of the picture. The development for this class of work should be energetic rather than otherwise, such, for instance, as that set forth for use in pictures coming within Class I, though it should not be carried quite so far. Very effective pictures of this class can be made with the stereoscopic camera.

Some of the most effective snow pic-Pinhole tures in the writer's collection were made Snow Pictures with a 4 x 5 camera equipped with an extra lens board over which had been pasted a bit of black paper punctured with an ordinary pin, estimated diameter 1 inch. The subject of pinhole photography has been thoroughly covered in this series by No. 27: Pinhole Photography, together with the Postscript given at the end of No. 54. The former describes several forms of apparatus for the making of pinhole photographs, but the above method will serve very well as an introduction.

With a pinhole in place of the lens, snow is rendered very effectively, having a soft effect completely in harmony with the subject. In fact, the most satisfactory picture the writer got out of his 96 test exposures referred to under Exposure, Class II, was a pinhole picture made with the above-described apparatus, the front board being racked out 5 inches from the ground-glass and an exposure of 14 seconds given on Seed 27 and Cramer Inst. Iso. plates. That particular exposure was one of five on each plate ranging from 2 to 30 seconds and was absolutely right.

The writer's method of ascertaining the exposures for pinhole photographs is very simple and, without going into details, it is sufficient to say that it requires that if a pinhole is $\frac{1}{3^{10}}$ or $\frac{1}{3^{12}}$ inch in diameter we arbitrarily consider it the f/32 stop; if $\frac{1}{64}$ inch in diameter we consider it the f/64 stop, and so on. We then ascertain the correct exposure for such stops, this being done from tables or calculations based on experience, and multiply the exposure so found by the square of the number of inches the pinhole is from the ground-glass.

For instance, in the case just given, the correct exposure for the No. 8 stop was estimated to be $\frac{1}{16}$ second. The pinhole being $\frac{1}{30}$ inch in diameter was considered the f/32 stop, this being equivalent to the No. 64 stop, which requires eight times the exposure required for the No. 8 stop, or $\frac{8}{15}$ second in this case. The pinhole was racked out 5 inches. This squared was 25, and multiplied by $\frac{8}{16}$ came to 13 $\frac{1}{3}$, which for luck was called 14

seconds, with the result stated.

With a full moon and plenty of snow Moonlight on the ground, the making of snow pic-Snow Pictures tures by moonlight is rare sport. Working with the lens at f/8 (No. 4) and a fast plate, either Seed 27 or Cramer Inst. Iso., the exposure will vary from a minutes in the case of an open landscape to a half-hour in the case of a view with evergreens or the like in the foreground. With the moon on the other side of a light building the exposure with the f/8 (No. 4) stop would be from fifteen to twenty minutes. With the moon shining directly on such a building the exposure would be from five to ten minutes. With a lens working at f/4 the exposure for open views would be less than a minute.

It is best to focus these views sharply on some object in the middle distance, this being accomplished by means of a focusing-glass or pocket microscope if necessary. But in order to get the true moonlight effect they should be diffused in printing, this being accomplished by interposing a thin sheet of glass or several sheets of gelatine or transparent celluloid between the negative and paper. The new Aristo Porcelain printing frame of the Eastman Kodak Company is a most ex-



THE BROOK
, Osborne I. Yellott



cellent arrangement for the purpose, as the amount of diffusion can be regulated to a nicety with very little

effort.

Moonlight photographs are very effective when made on platinum paper and toned to a deep blue by one of the methods described in No. 40: Platinotype Modifications. If there are lighted windows in the view, the whole can be rendered most effective and realistic by spotting the windows out in such a toned print with a brush dipped in a saturated solution of carbonate of soda, this being best done after the print is dry. The alkali removes the blue tone and leaves the window much lighter by contrast and of a ruddy tone very similar to lamplight. A brightly illuminated building photographed by moonlight and treated in the way suggested has some of the elements of a fake photograph, but is exceedingly interesting.

A most interesting branch of winter Snow Crystals work is the photographing of snow crystals and frost. The work is exceedingly

interesting in itself, and the resulting pictures add greatly to the variety of the worker's collection of photographs. Mr. Wilson A. Bentley, of Vermont, is the best known of our American workers in this line, and has described his methods as follows: "This work requires no very expensive or complicated apparatus; any ordinary photo-microscope apparatus, consisting of microscope and camera, such as are furnished by almost any dealer in photographic goods, will serve admirably; indeed, one may arrange a home-made apparatus that may serve nearly as well. For this work it is necessary to line the tube of the microscope with thin black paper, to guard against possible reflection. An extra groundglass frame, containing a clear glass plate in place of the ordinary ground glass, should be provided. This is used for final focusing. Other necessary accessories are a clean broom splint and a stiff feather, and a thick black card to slip over end of microscope objective while drawing and inserting plate-holder slides. microscope objective alone (without the eyepiece) is used in this work. If but one is used it should be of 3/4 inch and of short axis. It is better, when possible,

to use two—a one-inch and a one-half-inch—as then both large and small snow crystals can be photographed. Much depends upon the excellence of the microscope

objective.

"Apparatus having been arranged, a suitable room must be found to contain it. It is best, if possible, to keep this room always as cold as the outside air temperature; it should contain but one unscreened window. The apparatus should be placed so that the micro-objective points out of this window, as the light entering therein, ordinary uncondensed daylight, serves best as a source of illumination. All the work of arranging and focusing the object, exposing the plate, etc., is done in ordinary daylight. A very small aperture (stop) must be used in sub-stage, by which to admit light for illumination—one-twelfth to one-fourteenth of an inch aperture is best. A large aperture, admitting a flood of light, is fatal to this work; it drowns out delicate shading and impairs contrast.

"The snow crystals should be allowed to fall directly from the sky upon a black board or cardboard to receive them. Undesirable forms should be often brushed from the board. As soon as one or more presumably perfect and beautiful forms alight, the board should at once be removed indoors, and those removed and placed upon a clean, unscratched glass slide. The point of a broom splint pressed very gently on or over the edge of the crystals until they adhere to it serves admirably for the purpose. They should then be pressed down flat upon it with the edge of a feather and placed under the observation of a microscope for examination, or, if not provided with the latter, placed directly upon the stage of the photographic microscope. If sufficiently symmetrical and beautiful it should then be centered on the ground-glass, and then accurately focused upon the clear glass plate. A small pocket microscope or ordinary focusing microscope should be used for this final focusing, and it is usually best to select some delicate rod or line near the center of the crystal to focus upon. All this latter part of the work,examination, centering, focusing, etc.,—should be done as expeditiously as possible, and all glass slides, cards,

splints, etc., handled only with thickly gloved hands, and the greatest care taken not to breathe directly upon the glass slides or crystals at any time. As soon as accurate focusing is accomplished, place plate-holder containing a 3½ x 4½ or approximate size rapid dry plate in place and give an exposure of from fifteen to seventy-five seconds, according to degrees of cloudiness, time of day and extension of bellows of camera. Bear in mind that length of exposure rapidly increases as bellows is extended, and vice versa. I prefer Carbutt's 'Eclipse' plates for this work and his 'A' plates for the lantern-slide positives.''

The adaptation of the microscope to use in photography is beyond the scope of this monograph, and, until the subject is covered in this series, full instructions and much practical information for the novice can be found in "The A B C of Photo-Micrography" by W.

H. Walmsley, recently published.

Frost Crystals varieties of frost and hoar frost crystallizations," says Mr. Bentley, in the

American Annual of Photography for 1904, "is not so difficult as the photographing of snow crystals, and some varieties may be photographed with a small portrait or rectilinear lens, But, assuming that the would-be frost photographer has both camera and lens and also a microphotographic camera and one-inch objective, the photographing of all the varieties of frost is made possible.

During very cold weather, or soon after a sudden lowering of temperature, the window-panes often contain charming examples of the skill of the frost king. These may be photographed with the ordinary camera. Some of the designs are so large that they should be taken full size or nearly so. Where a higher magnification is required an extension camera must be used. The best method of photographing window frost crystals is by the method of oblique light. This causes the outlines and details of the crystals to appear white upon a dark ground. This is best accomplished by placing outside the window, or portion of window, to be photographed, and directly in front of the lens, a large black card or larger background.

"The smaller hoar-frost may be found after relatively mild, cold, still nights on fences and fence posts, grass, leaves, and various objects lying upon the ground. They should be collected upon a black card by brushing them off the objects upon which they form, care being taken not to break them. The crystals must then be placed upon a glass slide, pressed down flat with a feather and photographed, using a photo-microscopic camera in the same manner as with the snow crystals."

Despite all possible care in exposure After-Methods and development, some of our snow negatives will be found upon completion not to print up quite as they should. If the snow has been developed up too strong the negative may be reduced by the use of the ammonium persulphate reducer, which attacks the high lights first. If too weak all over it can be intensified with the Agfa or mercurv intensifier. If both weak and lacking in contrasts any amount of contrast can be obtained by the use of These methods have been the uranium intensifier. fully covered by several monographs in THE PHOTO-MINIATURE series, and it is only necessary here to make the suggestions. It might be well to add that it is frequently possible to block out objectionable patches of dark ground in snow pictures by applying a little opaque on the back of the negative and also to strengthen up weak high lights in the same way, or by judicious retouching.

On this subject Mr. Gleason says, "The amateur has so many printing papers at his command that it is not always an easy matter to select those best suited to the work he is doing. For some pictures the platinotype undoubtedly gives prints which cannot be equaled by any other process. The white snow, with its delicate shadows, the dark tones of buildings and trees, as well as gray tones of the winter sky are all faithfully and beautifully rendered. No other process gives such a faithful rendering of atmosphere,—that elusive quality which almost always is one of the elements of a successful winter picture. Care should be taken that the prints have that cold tone which is so appropriate to a snow

picture. Old paper and developing solutions give a slight warmth of tone which is very pleasing in many branches of pictorial work, but which should be avoided in pictures where all is snow and ice. In such cases use fresh paper and developer. The developer for platinum paper should not be used when very cold, or

mealy and coarse prints will result.

"Many fine snow pictures are made upon the developing papers now so universally used. The desired coldness of tone is easily obtained, but the pure blacks and chalky whites so often present in prints made upon these papers should be carefully avoided. Study the capabilities of your printing process, whatever it is, and then do not try to exceed those limits. Do not be content until you have the very best print obtainable from the negative.

"Some winter pictures make very effective gum prints. We have seen a number of such prints in which the very spirit of winter has been pictured. Any one who would try this interesting process should carefully study the monograph on Gum Printing,

PHOTO-MINIATURE No. 22.

"Winter pictures made in the city with a handcamera are often capable of enlarging, in which case a moderate-sized bromide enlargement is very satis-

factory."

In addition to the methods suggested by Mr. Gleason, the writer has found the carbon process especially adaptable to winter work, it being very easy by using sensitizing baths of different strengths to overcome defects in negatives and get pleasing prints full of the desired pluck and vigor, where these elements are required. In this work the colder tones should be used; a snow scene in red chalk or sepia, for instance, being an abomination to any one save a Hottentot.

On this subject Mr. Gleason says,

"Many good pictures are spoiled through
poor mounting. The mount should
serve to set the picture off to its best advantage, but
should never be so prominent as to detract from the
beauty and interest of the print. Pictures are greatly

influenced by the color and tone of the mount. A cold black and white or gray print seldom looks well on a warm brown mount. The mount should always harmonize in color with the print. A heavy dark mount will overcome the beauty of a delicate print, and a strong print would look out of place upon a combination of light-toned mounting paper. One will learn more by observing a few effective examples of modern mounting in some exhibition than he ever could by reading.

Some very useful ideas on the subject of mounting and framing our winter pictures can be learned from

No. 20: Trimming, Mounting and Framing.

OSBORNE I. YELLOTT.

BOOKS

Mr. Yellott has so thoroughly indicated the most helpful books of reference in discussing his subject that a separate list would be superfluous. We would, however, give special mention to Mr. Rudolph Eickemeyer's "Winter," recently published by Harper Bros., N. Y. (\$2), as a work which the reader can profitably study for inspiration in his winter work,

Potes

Among the new introductions of Taylor, Taylor & Hobson, Ltd., is a focusing magnifier for the more satisfactory examination of the image formed on the focusing screen of the camera. This is a handy little instrument which draws out for use like a small telescope, closes for compactness, and is provided with a screw adjustment to adapt it to the individual eye. In its workmanship the focusing magnifier shows the same excellence and convenience in handling so noticeable in the other products of this firm.

A

During the course of the year we receive many inquiries concerning reliable instruction in different branches of photography. To those seeking instruction of this sort, we would suggest sending to the American School of Art and Photography, Scranton, Pa., for a copy of their booklet, just issued, entitled "Proftable Professions," which very fully describes the facilities of this school, together with the advantages of their mail instruction system.

4

We acknowledge with pleasure the receipt of an excellent portrait of L. F. Hammer, Esq., the manufacturer of the well-known and popular Hammer Plates. The portrait is accompanied by the best wishes for the New Year from Mr. Hammer, and we feel sure that the happy users of Hammer Plates all over the globe will join with us in reciprocating these good wishes.

4

We have to thank Mr. W. B. Luce, Hingham Center, Mass., for a very interesting brochure titled "Kites, and Experiments in Aërial Photography." This brochure, apparently published by Mr. Luce in 1898, gives the author's personal experience with kites and photography from kites, being illustrated with half-tones from kite photographs and many diagrams explaining the practical manipulation of kites. It should be seen by those interested in the work described in THE PHOTO-MINIATURE No. 52. The price is 25 cents.

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Photography at the World's Fair, St. Louis. At the Chicago Exposition of 1893, hand-cameras were allowed within the grounds on the payment of a fee of \$1.00 a day to the official photographer, who issued and sold these daily permits to amateurs. the St. Louis Fair this summer, the Photographic Concessionaire will have nothing to do with issuing permits for cameras. Up to date all cameras without tripods have been allowed within the grounds without charge. Whether this will continue when the Exposition is open lies with the Division of Concessions and Admission. It is probable that a fee will be charged during the Exposition period, although this has not yet been definitely decided. Hand-cameras may be carried into the fair grounds without charge, the size 4 x 5 being the limit, and no tripods will be allowed without a permit from the Division of Concessions and Admission. The minor rules regarding the use of cameras have not been definitely set forth as yet.



The increasing popularity of carbon printing, and incidentally of the Elliott Carbon Tissues, has necessitated a new edition of the little booklet "How to Make Photographs in Fifteen Different Colors by the Carbon Process." This has just been published for free distribution by G. Gennert, 24 East 13th street, and interested readers should secure a copy of this little booklet while it is available.

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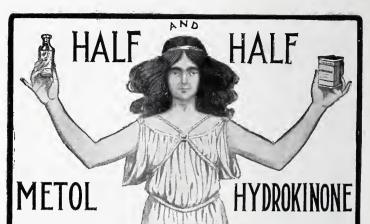
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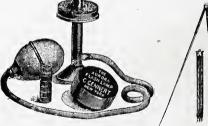
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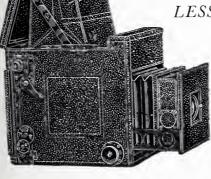
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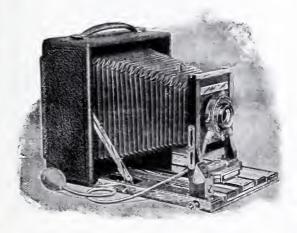
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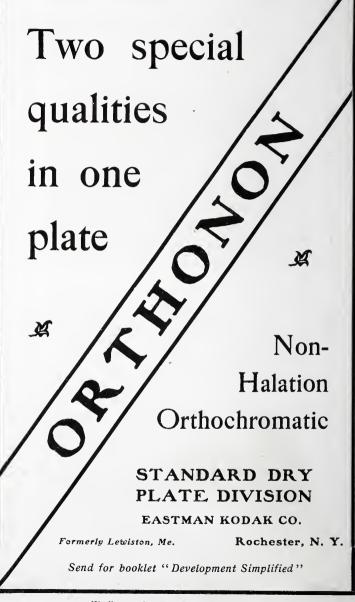
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The Photo-Miniature

A Magazine of Photographic Information EDITED BY JOHN A. TENNANT

Volume V

NOVEMBER, 1903

Number 56

THE HURTER AND DRIFFIELD SYSTEM:
BEING A BRIEF ACCOUNT OF THEIR
PHOTO-CHEMICAL INVESTIGATIONS
AND

METHOD OF SPEED DETERMINATION

It was a source of considerable disappointment to my late colleague, Dr. Hurter, and to myself, that the primary object we had in view when we published our photo-chemical investigations, was not more fully realized. Our immediate object was to provide amateur photographers, like ourselves, with a method of determining the speed of the plates they used, and to lead them to substitute methods of scientific precision for the rule-of-thumb empiricism so generally practiced. That our system has not been more generally adopted by amateur photographers is probably due to the somewhat abstruse mathematical treatment which the subject necessitated in the first instance, and to the fact that our publications were so widely distributed over the various journals as to render them difficult of access.

The desirability of publishing a short and concise account of our investigations, and their practical application, in a popular form, and as free as possible from the mathematical considerations involved, has often presented itself to my mind; and the cordial invitation of the editor of THE PHOTO-MINIATURE to provide such a treatise, as a contribution to this excellent series of photographic handbooks, seemed to indicate that the opportunity had arrived. I therefore

propose, in this little monograph, to explain, in as simple language as possible, our discovery of the law which expresses the action of light upon the sensitive plate; its bearing upon the functions of exposure and development, and the method of speed determination

which was the outcome of this discovery.

Our investigations date from the period when we first made the acquaintance of the gelatine dry plate. Accustomed, as we were, to the uniform rapidity of the old collodion wet plate, the wide variation in the speed of gelatine plates was, to us, a serious embarrassment. We were, accordingly, strongly impressed with the importance of discovering a means of determining the speed of these plates by some more satisfactory method than that of trial in the camera, and one which would enable us to apply strictly proportional numerical values to the results obtained.

Further, we had long felt that art in photography ceased to play any part the moment the cap was removed from the lens, and that every subsequent operation, whether exposure, development, printing or enlarging, was strictly a matter of science, and amenable to calculation. While we quite realized that the artist will always produce the best picture, we contended that the scientist will produce the best negative. The photographer, therefore, who combines scientific method with artistic skill is in the best possible position to produce good work. Hence, our aim was to raise technical photography from an empirical art to a quantitative science.

The Technically Perfect Negative

The Technically Perfect Negative

The Technically Perfect Negative

The Technically Perfect Negative most valuable distinction of photography lies in its capacity to truthfully represent natural objects, both as regards delineation of light and shade. The truthful representation of light and shade, however, involves the production of a technically perfect negative, of which it is necessary

to give a definition.

We define a technically perfect negative as one in which the opacities of its gradations are proportional to the light reflected by those parts of the original object which they represent. It will be well to keep this defi-

nition in mind, as we shall have to refer to it again when we come to consider the action of the light. If photography is to be capable of rendering gradations truly, this relationship, and no other, between the opacities and the light-intensities which produced them must exist. Our investigations show that such a relationship does exist, but only when a plate has received what we term a correct exposure.

The Definition of "Opacity"

Case silver) to impede the passage through it of light. "Transparency" is the inverse of this, and is measured by that fraction of the original light which a substance transmits. The opacity of a deposit of silver, which transmits one-half the original light, is 2.

"Density" pose of our investigations, the connection between the exposure, or the light-intensity, and the opacity, we found that this relation is of a very complicated nature; while that which exists between the exposure and the actual weight of silver, representing a given opacity, is comparatively simple. To the relative quantity of silver deposited per unit area, we applied the term "density"; and, as the relation between the density and opacity is also of a simple character, the density forms a connecting link between the exposure and the opacity.

The relation which exists between density and opacity is expressed by saying that the former is the logarithm of the latter. An opacity of 10, which transmits $\frac{1}{10}$ of the light it receives, is therefore represented by a density (weight of silver) of 1.0, because 1.0 is the common learning of 1.0.

logarithm of 10.

Having regard to the density, the law which alone would produce absolutely true tones in photography would be expressed by saying that the quantity of silver reduced on the negative is proportional to the logarithm of the light-intensity,

"Density" and "Opacity" Confused based on and led to misunderstanding of our publications. Photographic authorities of eminence, indeed, have seriously complained of our making the distinction at all, and of the great importance we attach to the density of the deposit, rather than to its opacity. Had they grasped the subject in all its bearings, they would have

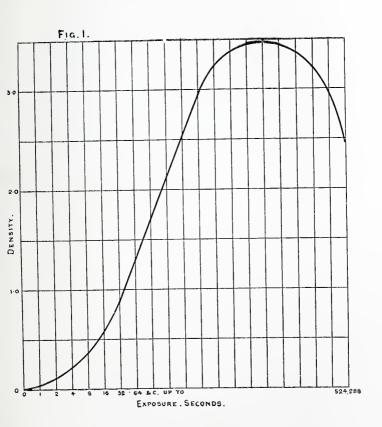
seen good reason for the course we took.

By the application of a factor, the density of a deposit is at once converted Explanation into the weight of silver per unit area; and, consequently, a measurement of the density affords a ready means of estimating quantitatively the amount of silver present, even in such minute quantities as to entirely defy the finest analytical balance. The important part which the density plays in all calculations of exposure for printing processes by development, fully justifies the prominence we gave to it; and, further, had our investigations been based upon the opacity instead of upon the density, we should never have discovered the law which expresses the action of light upon the sensitive plate. For the purpose of measuring the density of a deposit, we devised a special photometer. This instrument is extremely simple in principle, can be readily constructed by any amateur, and will be fully described at a later stage.

ACTION OF LIGHT UPON THE SENSITIVE PLATE. THE "CHARACTERISTIC CURVE."

The reader will now be in a position to follow the procedure by which we traced the action of light upon the photographic plate, and which, in turn, led to the discovery of what we termed the "characteristic curve."

Our earliest investigations were conducted upon thickly coated slow plates, especially manufactured for the purpose. Upon one of these plates we made a series of exposures, doubling each exposure as we proceeded. This course had the advantage of enabling us



very rapidly to trace the action of light through a large range of exposures: and, at the same time, led us to discover that the relationship between opacity and exposure which our definition of a perfect negative demands, does actually exist. After development, etc... the density resulting from each exposure was carefully measured and its value plotted on the ordinate, or exposure line, representing the corresponding exposure, as shown in Fig. 1. The points thus obtained were then joined, and resulted in a peculiar curve which we styled the "characteristic curve" of the plate. It will be noted that the vertical scale of this diagram indicates density, or amount of silver; while the horizontal scale indicates exposure, or light-intensity. It will also be observed that the horizontal scale progresses in geometric series, each successive exposure (equidistant on the scale) being double the preceding exposure; the horizontal scale is thus the logarithmic scale of the ordinary slide-rule.

An examination of the characteristic curve shows that it consists of four distinct branches, gradually merging from one into the other. It commences with a strongly bent portion, which then merges into a straight line; this gradually assumes a curvature in the opposite direction, until it reaches a maximum density, when the curve takes a downward course. The four distinct branches of this curve correspond with the phenomena of under-, correct and over-exposure, and of reversal, with which the practical photographer is

familiar.

These distinctive periods in the action of the light upon the sensitive plate are due to the fact that the work done by the light, at any moment of the exposure, is proportional to the amount of energy received at that moment by the unaltered silver bromide; and, as the silver bromide is gradually altered, the amount of unaltered silver bromide grows gradually less and less. Were this not so, the density, and not the opacity as demanded, would be, throughout the entire range of exposures, proportional to the light-intensities; every picture would appear what we call under-exposed, and truth in photography would be an impossibility.

We shall now proceed to consider the subject of

EXPOSURE,

and, in doing so, it will probably assist the reader if, instead of illustrating the relationship between density and light-intensity, or exposure, by means of a curve, we do so by a series of steps, which may be collectively taken to represent a peculiarly constructed staircase. This staircase (see Fig. 2.) is, in a more or less modified form, common to all plates.

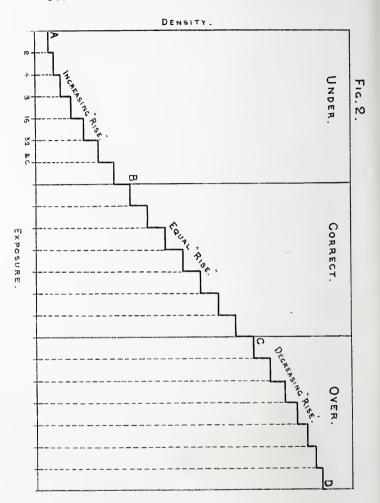
Correct
Exposure
Imperative

While many photographers attach very little importance to accuracy in exposure, and maintain that errors may be

readily corrected by suitable modifications in the composition of the developer, we have always strongly insisted that a correct exposure is an essential foundation if we aim to produce a technically perfect negative. It must, however, be clearly understood that, by a correct exposure we do not imply that there is necessarily one exposure, and one only, which will yield a negative answering to our definition. Fortunately, most plates admit of some latitude in this respect, a matter which we shall further consider at a later stage.

When we make an exposure in the camera, we impress upon the sensitive plate a latent range of gradations. If our exposure be correct, this latent image bears a truthful relationship to the light-intensities which produced it; if our exposure fall outside the limits which the latitude of the plate permits, this relationship will accordingly be false. Our contention is that a latent image, false in its gradations, cannot, by modifications in the constitution of the developer, be made to yield a visible image true in its gradations. The practice of photography, by methods of scientific predetermination, imperatively demands a correct exposure as a fundamental condition.

Returning now to the staircase depicted in Fig. 2, and having regard to the "rise" of the individual steps, we note that three distinctly different conditions exist which represent the periods of under-, correct and over-exposure, respectively. Under these heads



we shall discuss them. The period of reversal may be dismissed; for, though of considerable scientific interest, it has little or no bearing on practical photography.

Commencing at A, and proceeding Period of as far as B, we notice that the steps are Undermarked by a gradually increasing rise; Exposure but at the very commencement, this rise is proportional to the exposure, or light-intensity. Bearing in mind that the rise of each step means growth in density, and keeping in view our definition of a perfect negative, it will be seen that we have here an altogether false relationship. In this case, proportionality exists between exposure and density, instead of between exposure and opacity. A negative the gradations of which fall within this period would yield prints which have been characterized as of the "chalk and soot "variety; and, by the practical photographer, would be recognized as under-exposed. The characteristic of this period is a negative in which the shadows, and nearly all the half-tones, are indiscriminately represented by almost bare glass; the highlights being marked by relatively extreme density. From this period we pass imperceptibly into the

From the point B, and extending to Period of C, the steps of the staircase are all of Correct equal rise; that is to say, each doubling Exposure of the exposure is represented by an equal increment of density. While the density grows arithmetically, the exposure progresses geometrically; and, as the mathematician calls each term of an arithmetic series the logarithm of the corresponding term of a geometric series, it will be seen that we have secured in this period that logarithmic relationship between density and exposure which truthful representation demands. The following ratios will serve as an example of this relationship.

Light-intensities (exposure) 1:4:16 (geometric).
Silver deposited (density). 0:0.6:1.2 (arithmetic).
Opacity.....1:4:16 (geometric).

Thus we see that a photographic plate is capable of truly rendering a series of light-intensities, i.e., of yielding a range of opacities proportional to the light reflected by the different parts of the object represented, but only on the condition that all its gradations fall within that portion of the staircase (Fig. 2) in which the steps are of equal rise; or, in the case of the characteristic curve (Fig. 1), within that portion which is represented by a straight line. Of course, there is the further condition that the plate must have a sufficiently extended correct period to include the required range of light-intensities. This will be further considered under the head of latitude in exposure.

A study of this period will show that the deepest shadow of a correctly exposed negative is necessarily represented by a certain deposit of silver; the presence of bare, or almost bare, glass would be an indication of the inclusion of the commencement of the period of under-exposure. In ordinary pictorial photography, however, it is quite admissible to include a few of the steps of unequal rise at either end of, but immediately contiguous to, the correct period, because of the inability of the eye to readily appreciate small deviations

from truthful rendering.

This period commences at C, and continues till the highest step in the Period of Overstaircase is reached, and the period of exposure reversal sets in. It is marked by a gradually decreasing rise in the steps which finally becomes almost imperceptible. A negative the gradations of which fall within this period would be equally as false. but in the opposite direction, as if its gradations fell within the period of under-exposure. The characteristic of under-exposure is too great contrast; in this period the contrasts are too small. The tendency of the gradations in the case of over-exposure is to approach one uniform density; hence, the flat results with which the photographer is familiar, in which the highlights and half-tones are represented by almost similar opacities. Obviously, if a negative is to be capable of yielding a print absolutely true to nature, it must include no steps in the under- and over-exposure portions of the staircase.

We shall now turn our attention to the subject of

DEVELOPMENT.

Having, by means of a correct exposure, established a true relationship between the latent gradations and the light-intensities, the function of development is to reduce the latent image to metallic silver. Something more than this is, however, involved in the process, because the time occupied in development materially influences the result. The photographer would say that, as development proceeds, the negative becomes denser. In order to make what really occurs quite clear, we will revert to the staircase as an illustration.

[In order to facilitate the textual references to the dia gram following, this space is left blank. — EDITOR.]

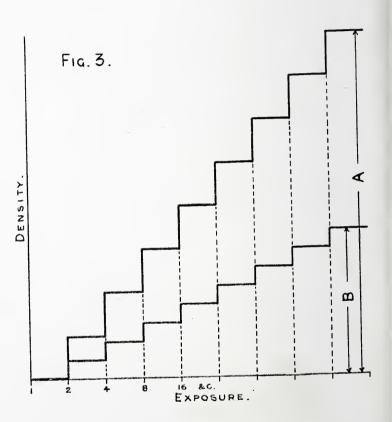


Fig. 3 represents two staircases, but, as we now assume that we are dealing with correctly exposed negatives, the steps in both are shown of equal rise. The two series of gradations are representative of two strips of the same plate equally and simultaneously exposed, and developed together, but for different lengths of time. The one series represents a development extending over, say, four minutes, and the other a development of, say, two minutes. Relatively, the two strips represent what the photographer would term a "dense" and a "thin" negative. It will be noticed that the maximum height (A) of one staircase is considerably greater than that (B) of the other; and, as the number of steps in each is equal, the rise of each individual step is greater in one case than in the other. The equal rise in the steps of each staircase indicates that the relationship between the densities is identical in the two cases; in other words, that the density ratios are constant and independent of time of development. But, while the relationship between the densities is constant, that existing between the corresponding opacities increases as the time of development is prolonged; hence, the range of light-intensities transmitted by the series of densities A would be far greater than that transmitted by the series of densities B. Between and beyond the two staircases shown, an infinite number of others may be considered to lie; but while, in each case, the densities would be correctly related to the light-intensities, there is only one staircase which would fulfil the conditions laid down in our definition of a perfect negative by yielding a series of opacities proportional to the light-intensities.

Time of Development and Density

tions of a sensitive plate to the action of a standard light for 5, 20 and 80 seconds respectively, and that the plate is of that degree of sensitiveness that the resulting densities are rendered in their true proportionality (correctly exposed). It will be found that the densities are related to each other as 1:2:3.

If we take a piece of elastic, represented by the line

AB, secured at the end A, and if we stick through it three pins at distances of 1, 2 and 3 inches from A, the three pins will represent our three densities after a development of, say, 2 minutes. If we now stretch the elastic, the pins will move further apart, as indicated



at CD and EF, which may be considered to represent developments of 4 and 6 minutes respectively. It will be seen from this that while, by increased development, we have increased the distance apart of the extreme densities, we have in no way interfered with the re-

lationship existing between the three.

In the case of under-exposure, these densities would not be related to each other as 1:2:3, but more nearly as 1:4:16, and the light transmitted by them would consequently be false in gradation. Prolonged development would merely stretch the densities further apart, but they would always retain their false relationship. The same remark applies to over-exposure, though the false relationship would be different. The experiment with the elastic and the pins will serve to illustrate the influence of time of development upon under-exposure by fixing the pins at distances of 1, 4 and 16 inches respectively from the point A.

These considerations lead to the conclusion that the function of exposure is to determine the relationship which shall exist between the densities and the light-intensities they represent; in other words, to determine into which portion of the characteristic curve the gradations of the negative shall fall. The function of development is then to determine, by its duration, the extreme range of opacities which the negative shall

include.

Our investigations forced us to the conclusion that the relationship existing between the densities and the light-intensities is, once and for all, determined by the exposure, and remains unalterable by modifications in the constitution of the developer, or by the time occupied in development, and so led us to recognize

the law of "Constant Density Ratios."

This conclusion, perhaps, did more than anything else to bring us into conflict with practical photographers. It had ever been held that errors in exposure could be corrected by judicious modifications in the constitution of the developer; or, in other words, that development could be made to usurp the function of exposure. Such views are, however, based upon empiricism, and entirely unsupported by quantitative methods of research. What gave rise to this popular opinion was, on the one hand, the employment of ammonia; and, on the other, the use of a soluble bromide in the developer. To the solvent action of ammonia upon silver bromide, and the facility with which it lends itself to the production of "fog," together with the apparent retarding action of a soluble bromide, the doctrine of corrective development is no doubt due; but the disturbing effect of these reagents (especially of ammonia) upon the density ratios is altogether irregular, and does not admit of scientific control.

THE LAW OF "CONSTANT DENSITY RATIOS"

has such an important bearing upon quantitative photography, that it is very important that the reader should clearly grasp the subject. To this end, the following practical example, taken from one of our earliest experi-

ments, will probably be of assistance.

Three separate exposures were made upon different parts of a plate extending across its width. The exposures given were equivalent to 1½, 2½ and 5 seconds, the light used being that of a standard candle placed at a distance of one meter from the plate. The plate was then cut lengthways into three strips, each of them being impressed with the same three exposures.

The three strips were next developed in the same solu-

tion for 4, 8 and 12 minutes respectively.

The second column gives the densities as measured by our photometer, the density due to glass and gelatine, and any fog inherent in the film being deducted. It will be seen that the density increased for the same exposure as the time of development was prolonged.

	1	2	3	4	5
	EXPOSURE C. M. S.	DENSITY	DENSITY RATIO	OPACITY	OPACITY RATIO
Strip No. 1 .	1.25	.310	1.0	2.04	1.0
Developed	2.5	.520	1.67	3.31	1.62
4 minutes	5.0	.725	2.33	5.30	2.59
Strip No. 2 .	1.25	.530	1.0	3.38	1.0
Developed	2.5	.905	1.70	8.03	2.37
8 minutes		1.235	2.33	17.18	5.08
Strip No. 3	1.25	.695	1.0	4.95	0.1
Developed	2.5	1.140	1.64	13.80	2.78
12 minutes	5.0	1.625	2.33	42.17	8.51

But the third column, which gives the ratio of the densities, shows that, within trifling errors of observation, the relationship between the three densities of each strip is identical; that is to say, prolonged development caused each density to grow, but in such a manner that the amounts of silver on the different strips still bear the same ratio to each other.

It is this unalterable relationship which we refer to

when we speak of "constant density ratios."

An Important Difference

But, though the density ratios are constant, the opacities, which appeal directly to the eye, do alter, not only in amount, but in ratio also, as is shown by columns 4 and 5. In the first strip, for instance, the extreme opacities were 2.04 and 5.30 respectively, while, after 8 minutes more development, the opacities became 4.95

and 42.17 respectively. The lightest shade in strip No. 3 is almost as opaque as the darkest in strip No. 1. The opacity ratios have also increased from as 1:2.59

to as 1:8.51.

It is this great difference in the opacity ratios, with which the practical photographer is so familiar, which led him to contradict our statements with respect to the constancy of the density ratios. The great mistake the photographer makes is in assuming that the opacity ratios are alterable at will. This is not so: the opacity ratios alter in accordance with fixed laws, just as surely as, by the same laws, the density ratios are unalterable. All the control the photographer can therefore exercise in development must result from intelligently working in obedience to these laws, and so rendering them subservient to his own ends.

That control of the utmost impor-Control in Development tance exists in development has already been indicated, but such control is confined altogether to the length of time the developer is allowed to act, during which no modification whatever should be made in the constitution of the developer with the object of correcting an apparent error in exposure. If, owing to erroneous exposure, the gradations are false, no alteration in the constitution of the developer can make them true. Photographers, instead of striving to make their reagents play the part of light, should take more pains to expose their negatives correctly, and leave to development its legitimate function. Were it not that some of the most eminent photographers have so long accustomed us to the idea that errors in exposure admit of correction in development, it is probable that our conclusions would be regarded as a common-sense view of the subject. It must be borne in mind that photographers have formed their conclusions on this subject from mere ocular inspection of their negatives—generally negatives of objects produced in the camera in the ordinary way. We have, on the other hand, made all our investigations by submitting parts of a sensitive plate to the direct action of a standard light. This has permitted us to measure our results, and so provided us with numerical data wherewith to compare and estimate them. It has also enabled us to discriminate between action on the plate due to light, and mere fog resulting either from the action of the developer, or inherent in the plate itself.

Dr. Emerson's awakened the interest of the well-known photographer, Dr. Emerson, who submitted the following problem to us for consideration; and, as it may still further assist the reader to grasp the distinction which exists between the functions of exposure and development, I propose to state the question propounded, and to give a few extracts from our reply.

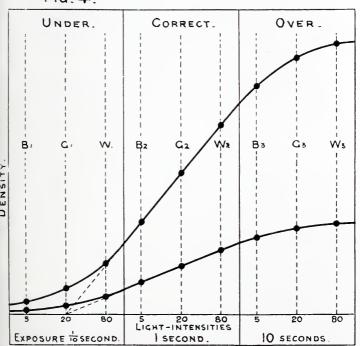
"Supposing," said Dr. Emerson, "I want to photograph three houses,—a white one, a gray one and a black one. What is it you say I have to do to secure truthful rendering of tone: what is it you say I can alter by development, and what is it I cannot alter?"

In reply, we proceeded to discuss the subject under the three heads of under-, correct and over-exposure; and we assumed that we had taken three negatives of the houses on separate but similar plates, and that they had received exposures of $\frac{1}{10}$, I, and IO seconds respectively. The subject was illustrated by Fig. 4, on which the three houses are represented by dots.

I. Under-exposure

If the exposure given have been insufficient, the three equidistant lines B1, G1, W1, may mark the light-intensities reflected by the three houses which, for the sake of argument, we will take as 5 for the black, 20 for the gray, and 80 for the white. What we affirm is that any alteration, either in time of development, or in constitution of the developer, will decide upon which of the system of curves the respective densities shall lie—whether, for example, on the lower or upper curve shown on the diagram. It would be possible, even in a case of under-exposure, aided by an experienced eye, so to develop that something akin to a correct relationship between the two extreme densities might result, but the density of the intermediate tone would be rela-

Fig. 4.



tively false; the density representing the gray house too

closely approaching that of the black house.

If the degree of under-exposure has been very decided, the ratios of the amounts of silver deposited would be as 1:4:16 (i. e., as 5:20:80), however long development might be continued. But, when the amount of silver is in the same ratio as the light reflected by the objects, the opacities of the images will produce prints false in tone, and this false relation being established by the peculiar form of the curve, the photographer has no power to alter it.

The opacity varies with the development, but it varies according to law: the photographer cannot cause the opacity of the white house to grow without that of the black house growing with it, in accordance with a

fixed law indicated by the system of curves.

II. Correct Exposure

If a longer (correct) exposure be given, the ratio of the silver deposited will be altogether different from that we have just considered. Instead of the silver being deposited in the ratio of the light-intensities 5:20:80, it will be deposited in the ratio of the logarithms of these intensities. With these particular intensities (5:20:80), this would mean that the difference between the amounts of silver representing the white and gray houses is the same as the difference between the amounts of silver representing the gray and

black houses.

Different treatment in development would result in different amounts of silver deposited, though their ratio would remain undisturbed, but any increase of density in the white house would result in a corresponding increase of density in the black and gray houses, in such a manner as to bring the three points on the lines B2, G2, W2, simultaneously from a lower to a higher curve. The photographer has the power to decide how far he will allow the density of the white house to proceed, but he cannot restrain the density of the black house while he allows that of the white house to increase.

Among the infinity of curves which are intermediate between the axis of the abscissæ and the extreme curve, there is only one which would correspond to a negative from which a print true to nature could be obtained. It is the decision of this curve which is the difficulty in development. When this curve is reached, however, the opacities of the three gradations representing the three houses would be exactly as 5:20:80, the ratio of the light reflected by the houses.

III. Over-exposure

In the case of unduly prolonged exposure, the images of the three houses would fall on the upper part of the curve where intersected, say, by the lines B3, G3, W3. The result of this would be that the tone of the gray house would too nearly approach that of the white house; whilst, in the case of under-exposure, it too nearly approached that of the black one. You might, by development, decide the density of one of the houses, but it would be out of your power to alter its relationship with respect to the other two.

EXPOSURE decides within which of the three periods (under-, correct or over-exposure) the three houses

shall lie.

DEVELOPMENT decides which curve of the system shall be reached.

THE DEVELOPMENT FACTOR

To the exact amount of development a negative receives we apply a numerical value. This value we term the "development factor," and it is determined by the inclination of the straight portion of the characteristic curve.

The importance of expressing the degree of development by a definite numerical value, and the advantage of such a system over the present method of comparison by crude generalizations, can hardly need pointing out. It is surely more scientific to state that the development factor of this negative is 0.8, and of that, 1.5, than to speak of them as being relatively "thin" and "dense";

and, besides, there are all the possible degrees of development within and beyond these limits which call for differentiation. As the desired development factor is reached simply by controlling the time occupied in the operation, there is no occasion whatever to examine a negative during the progress of development; it may straightway be fixed the moment the time has expired. This consideration is of special importance in the case of orthochromatic plates, during the development of which, examination, by any serviceable light, is unsafe.

The method of assigning a numerical Modifying value to the degree of development will the "D. F. be explained later on, but it may be here stated that when this value is 1.0, the gradations of the negative are absolutely true to nature. statement, however, requires some qualification in practical photography. Inasmuch as the negative is not the ultimate object we have in view, but the print which it is intended to yield, the nature of the desired print exercises considerable influence upon the development factor of the negative. Photographers have learned by experience that a certain negative will yield a more satisfactory print by the carbon or platinum process than it will, say, on a silver paper. This is because different papers vary in the range of gradation which they are capable of rendering. A silver print on highly enameled paper is more brilliant, and has a more extended range of gradation, than a silver print on matt paper, owing to the greater transparency of its image. By the range of gradation of a particular paper is meant the extreme difference of tone, ranging from the normal tint of the paper itself to the deepest shade it is capable of assuming, beyond which no deeper can be differentiated by reflected light. The range of the paper upon which we intend to print is therefore a factor in determining the degree of development of the negative; and this is further influenced by the range of light-intensities reflected by the subject we wish to photograph. This latter range varies considerably, that of an ordinary open landscape being probably the least, and that of a dark interior, including a window in the picture, probably the greatest met with in ordinary practice. The development factor, therefore, for an interior requires to be less than that for an open landscape, in order to adapt their respective light-intensities to the range of the paper upon which the print is to be made. It is probable that the positive which most truthfully reproduces the gradations of the negative, particularly when the range is extensive, is a transparency on a glass plate.

The question as to whether a negative is required for the production of contact prints, or for the purpose of enlarging, say, on bromide paper, also affects the de-For reasons which cannot be fully velopment factor. explained here, the optical value of a given density is totally different under the two conditions. In the case of an enlargement, much of the light passing through the negative is lost by reflection from the surface of the paper, and consequently does no work at all; while in the case of a contact print a considerable portion of the light reflected from the surface of the paper is at once reflected back again by the two reflecting surfaces of the negative. For the purpose of enlarging, the densities of a negative are practically much greater than for the purpose of contact printing, and a less development factor is consequently demanded. Roughly, a photometric density of 1.0 corresponds with a contact printing density of 0.8, and an enlarging density of 1.4.

Another matter which materially affects the development factor is the artistic aspect of the question. We cannot look around the walls of our photographic exhibitions without being struck with the straining after effects, which certainly cannot be characterized as true to nature. It is not my province to criticize work of this kind, but to point out that a scientific knowledge of the functions of exposure and development, and a determination of the characteristic curves of the plates he uses, will place the photographer who wishes to produce abnormal results in a position to do so, with the certainty of achieving the end he has in view. If he desire a false gradation, he may deliberately include portions of the periods of under- or over-exposure in his negative; and the effect produced, by a departure from correct exposure, may be further influenced by the development factor employed.

It is not within the scope of this work to show how the range of different printing papers and of the light-intensities reflected by different classes of subjects enable one to calculate the exact development factor required in any given case. My immediate object is to impress the photographer with the great advantage of being able to express and compare the degree of development of his negatives by definite numerical values; to show how the development factor may be controlled, and thus assist him to produce negatives of the precise quality he desires.

As a rough initial guide to those about to put our system into practice, the following values may be indicated for the development factors of negatives for the

production of contact prints:

Ordinary 1	an	ds	ca	рe	s						. г.	3
Interiors .												
Portraits											, 0.	8

STANDARD LIGHT AND UNIT OF EXPOSURE

When we commenced our investigations, we adopted as our unit of light the intensity of the light yielded by a standard candle acting at a distance of one meter; and, as our unit of time, the second; our unit of exposure is therefore the product of the intensity of the light of a standard candle at a distance of one meter, and of the second; and this unit we termed one "candle-metersecond" (C. M. S.). While we quite recognized that the candle is by no means an ideal standard, we adopted it, in the first instance, because we were not aware of any better substitute, because it was ready to our hand, recognized as a standard and readily obtained. It is necessary, however, to exercise control over the height of flame of the candle. The height should be exactly 45 millimeters from the tip of the flame to that portion of the wick where blackening commences. This height of flame is readily obtained by judicious trimming of the wick, and, when once attained, it will remain constant sufficiently long for any ordinary experiment.

Our adoption of the candle as our standard light does not at all imply that no other standard light may be employed. Any source of light may be adopted for the purpose of speed determination; but as the candlemeter-second is the unit of exposure decided upon, any source of light other than the candle will require to be carefully standardized to the candle itself. This must not be done by ordinary photometric means, but by actual measurement of the work done upon a sensitive plate by the two lights to be compared; otherwise speed determinations made by different operators would not yield comparable results. In my own practice, I frequently find it more convenient to use an amylacetate lamp than the candle; but in this case, a correction has to be applied, my amyl-acetate lamp being 1.4 times less actinic than the candle. The Dibdin standard pentane lamp has also been adopted by some plate-manufacturers in this country (England).

Another obvious precaution to be taken in using the candle, or, indeed, any other standard light, is that it

must be carefully protected against drafts.

STANDARD DEVELOPER

As the activity of the various reagents employed as developers differs considerably, it is necessary to adopt a standard developer for the purpose of speed determination, if the results obtained by different operators are to be comparable. To the amateur, however who employs our system simply for his own guidance, it is quite open, of course, to employ any developer he thinks fit, but he must clearly understand that the speeds he obtains will not necessarily correspond with those obtained with our standard.

As the result of our earlier investiga-Pyro-Soda tions we decided in favor of ferrous oxalate as our standard developer, and an excellent standard it is from many points of view. It has, however, never been a popular developer, and it has the drawback of being considerably less energetic than alkaline pyrogallol. After further investigation, therefore, we decided to employ a pyro-soda developer as our standard, satisfying ourselves that it possessed the requisite qualifications. At the same time we found it necessary to reprobate as strongly as possible the use of pyro-ammonia. Owing to the solvent action of ammonia upon silver bromide, the behavior of this developer is so irregular as to render it altogether inapplicable for work of a scientific character.

The formula of our standard pyro-soda developer is

as follows: 1,000 parts of developer contain

Pyrogallol			8 parts
Sodium carbonate (recrystallized)			40 parts
Sodium sulphite	٠		40 parts

Perhaps the best way of compounding this developer is to keep the sodium carbonate and sulphite in a solution of convenient strength, and to add the pyrogallol dry immediately prior to development, together with the requisite amount of water over and above that in which the carbonate and sulphite are dissolved. If preferred, however, the pyrogallol may be made up in solution together with the sulphite, the carbonate being kept in solution by itself. In any case, the best plan is to keep the solutions in small bottles, each containing, say, 4 ounces, filled up to the neck and tightly corked.

It will probably be remarked that the quantity of pyrogallol is much larger than the quantity usually recommended; the amount given was, however, decided upon after careful investigation. Developers act in two ways-by direct absorption into the film, and by a process of diffusion. Unless there be present in the quantity of developer directly absorbed by the film, sufficient of the reducing agent to reduce the whole of the silver salt necessary to form the image, the higher densities will fall short, and the correct period of the plate will be, in consequence, curtailed. The quantity of pyrogallol recommended, therefore, is calculated to make the best of the plate. Ferrous oxalate is a developer which acts by diffusion, the film being incapable of directly absorbing sufficient of this reagent to complete the operation of development. From this point of view it is inferior to pyro-soda containing the amount of pyrogallol prescribed. As, however, our standard pyrosoda developer is very energetic in the case of some plates, and as it may be considered desirable to prolong the time of development, the photographer may, if he think fit in his ordinary practice, reduce the strength to one-half that of the standard given. Beyond this, the strength should certainly not be reduced, or a serious falling off in the higher densities will result.

It will be noted that our standard Free Bromide formula does not include a bromide as in the one of its constituents. This omission Developer is of the utmost importance, and must be insisted upon, at any rate when determining the speed of a plate. While the pyrogallol and the alkali are essential elements of the developer, a bromide is altogether unessential. It is a product of the chemical change which takes place during the process of development; and it is well known in chemical dynamics that the products of a reaction generally retard the speed of the reaction. This is precisely what occurs when development takes place in the presence of free bromidean apparent retardation in the speed of the plate; but that this retardation is only apparent is shown by the fact that it can be compensated by time of development. The result of this is that a plate developed in the presence of a bromide has practically different speeds, depending upon the length of time the plate is developed. Hence, bromide has a seriously disturbing effect upon speed determination, and interferes considerably with the practice of photography by quantitative methods. I shall have occasion to say more upon the influence of bromide when we come to consider the subject of speed determination.

Standard Temperature that development must be conducted under standard conditions as regards temperature. As a temperature which may be readily commanded both summer and winter, we decided upon 65° F. The development dishes I recommended may be conveniently constructed of ordinary tinned iron plate, and made to suit the dimensions of any plate desired. The dish has flanges at either end which rest upon the edges of an outer water-bath, also of tin plate, and which may, with advantage, in very cold weather, be protected by some non-conducting material. In use, the outer bath is filled up with

water at 65° to such a level as to allow the bottom of the developing dish to rest upon the surface of the water. The exposed plate should be placed in the dish and covered up sufficiently long before the developer is applied to allow it to assume the requisite temperature. The vessels containing the developer must likewise be allowed, by immersion in a waterbath, to acquire the standard temperature. During development, the dish should be gently rocked. As we are no longer dependent upon ocular examination to determine when development is complete, but decide this all-important question by time alone, the plate should be removed from the developer a second or two before the requisite time has elapsed, and the moment the time has expired it should be rapidly passed through a dish of water, and then straight into the fixing-bath.

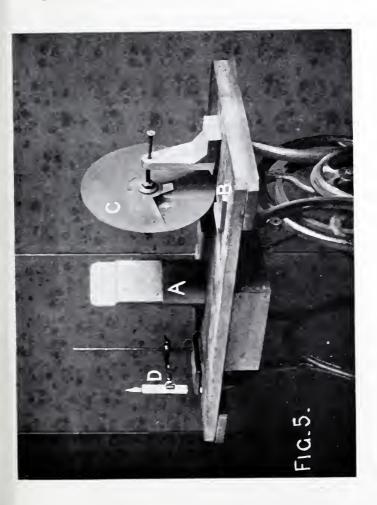
Special Apparatus

Before we can proceed to determine the speed and other characteristics of a plate, it is necessary to provide ourstrips of the plate to be examined, and one to measure the densities of the deposits developed on the strips. In their essentials these instruments are exceedingly simple, and may readily be constructed by any amateur at all accustomed to the use of tools.

THE EXPOSING APPARATUS

When, in our original researches, we wished to make a series of exposures upon a plate, we made them successively. As, however, eight or nine exposures are necessary in determining the speed of a plate, we found that to make a separate exposure for each gradation involved a considerable amount of time, and not only so, but any trifling variation in the luminosity of the candle-flame made itself felt. We overcame these objections by employing a revolving disc so perforated as to yield, with a single exposure, the whole series to gradations required. By this means, also, any trifling fluctuation in the light proportionately affects all fhe gradations.

Fig. 5 represents the first revolving disc apparatus



we constructed. It will be seen that an old sewingmachine table was called into requisition so as to permit the disc to be driven by foot, thus leaving the hands free to operate the shutter of the dark slide containing the strips of sensitive plate. The front of the dark slide is shown at A, the shutter being constructed of thin metal so that when the slide is placed in position at B, the sensitive strips will be as close as possible to the revolving disc, C. D is the standard candle fixed at a distance of one meter from the surface of the sensitive strips.

The dimensions we adopted for the strip of plate to be used for the purpose of speed determination are 4^{14} x $\frac{13}{16}$ inches, being the length of a quarter-plate by one-fourth of its width; a quarter plate thus cutting into four strips. The dark slide is constructed to take

two such strips lying, of course, horizontally.

It may be here mentioned that if one of the edges of a quarter-plate show a falling off in the coating of emulsion, the strip including such an edge should always be discarded; indeed, the best possible course is to cut the strips from the center portion of a larger sized plate.

We must now consider the most important detail of the apparatus, namely, the revolving disc. This is separately represented in Fig. 6, which is a photograph of a disc constructed of a piece of cardboard II inches in diameter. The length of the strip (414 inches) divided into ten equal parts gives the width of each successive step in the perforations of the disc. Nine parts only are, however, required for the exposures, the tenth being protected from light in the dark slide during the exposure, so as to provide what we term the "fog strip." It will readily be seen how the angular apertures of the perforations are arranged to yield a series of exposures, each being double the preceding one. The longest exposure is represented by an angular aperture of 180°, obtained by cutting out two entire quadrants of the circle; the next, by an angular aperture of 90°, or one quadrant; the next, of 45°, and so on; the angular aperture of each successive perforation being halved till the ninth is reached.

The apertures in the disc, of course, require to be

FIG. 6.



cut with the greatest precision, as any inaccuracy in the angular openings would necessarily disturb the ratio of the exposures. The disc itself may be constructed of any suitable material, of which sheet zinc and ebonite may be mentioned. Such a material is undoubtedly superior to cardboard where frequent use is demanded or rough handling is incurred. Nevertheless, the cardboard disc shown in the illustration has been in use for upward of ten years, and is still in perfect order. Should cardboard be decided upon, the simplest way of

cutting the perforations is to cut in the cardboard itself two openings decidedly larger than the finished dimensions of the apertures. The apertures themselves are accurately cut in two pieces of stiff paper, or very thin cardboard, of fine, hard texture, and these pieces are then fixed, by means of an adhesive, in their proper positions over the openings already cut in the disc. The disc, when finished, should be coated with deadblack paint and mounted upon a central spindle. The rapidity at which the disc is caused to revolve is not of material importance, but 500 revolutions per minute may be indicated as a convenient speed.

THE PHOTOMETER

This instrument, which is illustrated in Figs. 7, 8 and 9, consists essentially of a small Bunsen photometer, and is based upon the relationship existing between density and opacity. We measure the opacity of the deposit, but in order to avoid calculations and references to tables of logarithms, the scale of the instrument is so arranged as to read directly the logarithm of the

opacity, which is the density.

The body of the instrument consists of a box constructed of timber, the front side being open and splayed outward at the top and two sides so as to protect the eyes from light while making measurements. Convenient internal dimensions of the box itself are 12 inches long, 9 inches high and 7 inches deep. either end of the box is a diaphragm of six millimeters diameter; and outside, as close as possible to the diaphragm, is a powerful duplex paraffin lamp. The two lamps may be, with advantage, attached, as shown, to the same oil-container which passes beneath the baseboard of the instrument, the height of the container admitting of adjustment by means of three leveling screws. The diaphragms, which must be exactly in the line of the axis of the instrument, are drilled in sheets of copper which fit inside the ends of the instrument. As the heat evolved by the lamps is considerable, it is necessary to protect the woodwork by means of asbestos millboard. The method of doing this is shown in Fig.





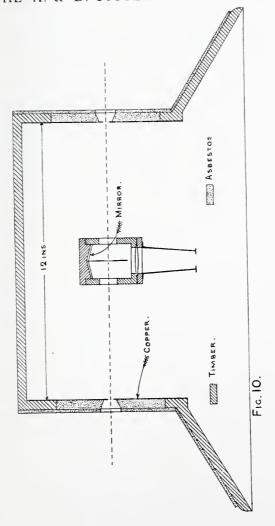


to, which is a section through the axis of the photometer. As much as possible of the timber at the ends of the box should be cut away, and the openings filled in with the millboard, thinner pieces of the same material entirely covering the outside of the ends, and also the splayed front on the lamp side. The whole of the instrument, excepting, of course, the scale, should

be painted dead-black.

Should the intending constructor be disposed to substitute, for the duplex paraffin lamp, any other source of illumination, it will be well here to caution him against the use of burners of the argand type. A circular flame, such as an argand burner has, would give utterly erroneous results. The whole principle of the photometer depends upon the use of a flat sheet of flame of such a size that, at whatever distance the indicating greasespot may be from the lamp, the angle determined by the diameter of the diaphragm, with the grease-spot as the apex, must be uniformly covered by the flame. It is therefore very necessary that the lamp-wicks be kept carefully trimmed, and this is best done by wiping away the charred wick with a piece of rag, the corners of the wick being rounded off with scissors. The lamps should always be allowed to burn about ten minutes before any readings are taken, so as to allow them to In adjusting the flames of the lamps, become steady. the operator should always view them through a piece of green glass, as gazing at the naked light would unfit the eye for the delicate work of deciding the grease-spot indications.

The construction of the small chamber containing the indicating grease-spot is clearly shown on Fig. 10. The chamber itself is a small box measuring 2 inches by 1½ inches inside. The grease-spot is inserted through a slit in the center of the upper side of the chamber, at the back of which are cemented, at a suitable angle, two small mirrors, in which reflections of the grease-spot from either side may be viewed through an eye-piece fitted to the front of the chamber. The eye-piece may be, with advantage, provided with a simple magnifying lens of suitable focal length, but this is not essential. On either side of the chamber a circular hole



is bored of about 34-inch diameter; these holes and the grease-spot lying, of course, in the axis of the instru-The back of the chamber carrying the mirrors should be made detachable. The chamber is carried upon a small block of timber which slides upon a carriage extending the whole length of the instrument. This block may be conveniently moved backward and forward (as shown in Figs. 7 and 8) by a rack fixed on the carriage and a pinion on the block; or, if preferred, the motion may be obtained by a cord fixed to the block and passing over pulleys at either end of the carriage, the pulley at the right-hand side being fitted with a spindle provided with a milled head. The block carrying the grease-spot chamber is provided with a pointer fixed in the center and reaching downward to the divisions on the scale of the instrument.

We must now proceed to consider two very important details of the photometer, namely, the grease-spot

and the scale.

To make a satisfactory grease-spot The Greaserequires a little practice, and the selec-Spot tion of a suitable paper. The paper should be fairly thin and unglazed; and while it should not be too bibulous, it should not be too hard and impervious. Having found a satisfactory quality, melt a little solid paraffin in a suitable vessel; next warm the end of a fine wire in the flame of a spirit-lamp, dip it quickly into the melted paraffin, and just touch the paper with it. This should produce a spot about one millimeter in diameter. It is just as well to produce a number of such spots,—say, one inch apart,—over the surface of the paper, and afterward to select the best spots for the purpose in view. As it is necessary that the appearance of the spot on both sides of the paper shall be similar, the paper must now be turned over and dots of melted paraffin placed exactly over the first spots.

It may here be explained that the less pronounced the grease-spot, the more sensitive it is; but, on the other hand, the less capable it is of indicating high densities. The reverse holds good in the case of a very translucent grease-spot. While it is quite possible to hit a happy mean, it will often be found convenient, in the case of very high densities, to resort to the use of a specially translucent spot. If a superabundance of paraffin has been deposited upon the spot, or if it be desired to render the spot less pronounced, the paper bearing the spot may be placed between two sheets of blotting paper and a warm flat-

iron lightly applied.

Having selected the most satisfactory grease-spots, they should be cut out of the sheet of paper, each spot being the center of a disc of, say, one inch in diameter. Each disc must now be gummed in between two pieces of matt black paper, into both of which a circular opening of about 3s-inch diameter has been cut. The grease-spot, of course, occupies exactly the center of the openings in the matt black paper, and the whole must be so trimmed as to bring the grease-spot accurately into the axial line of the photometer when placed in position in the little chamber.

Before discussing the scale of the The Scale instrument, it must be clearly understood that its divisions are absolutely determined by the distance between the diaphragms in the ends of the photometer. The data here given are for an instrument of which this dimension is 12 inches. It will therefore be seen that this measurement must

be most accurately adhered to.

The zero point of the scale is exactly midway between the diaphragms in the two ends of the photometer, or, exactly 6 inches from either diaphragm. On either side of the zero point the scale is symmetrical. For the purpose of constructing the scale, the distances from the zero point to the chief divisions (.1, .2, .3, .4, etc.) lying symmetrically on either side of it, are given in the following table:

VALUE OF DIVISION	DISTANCE FROM ZERO POINT inches	VALUE OF DIVISION	DISTANCE FROM ZERO POINT inches				
0.1	0.342	1.0	3.114				
0.2	0.684	1.1	3.360				
0.3	1.026	1.2	3.594				
0.4	1.356	1.3	3.804				
0.5	1.680	1.4	4.002				
0.6	1.992	1.5	4.188				
0.7	2.292	1.6	4.356				
0.8	2.580	1.7	4.512				
0.9	2.856	1.8	4.656				

The values of the divisions may be marked on the scale as here given, but in this case the values to the right hand of the zero point must be considered as negative, and those to the left as positive. It will, however, simplify reading the densities if the division 1.8 at the extreme right hand of the scale be regarded and marked as 0 (zero), the succeeding divisions being marked .1, .2, .3, .4, etc., proceeding up to 3.6 for the final division on the left hand of the scale. In this case, the true zero of the scale will be marked 1.8. This plan being adopted, we have merely to deduct the smaller from the greater reading in order to determine the density. The main divisions of the scale should be further divided into five equal parts, the value of each subdivision being 0.02.

At the right-hand end of the instrument it will be seen that a rotating disc is provided which is perforated with a number of supplementary diaphragms, gradually decreasing in diameter from that of the fixed 6-millimeter diaphragm in the end of the photometer itself. In practice, however, three additional diaphragms will be found quite sufficient. They should be approximately equal, in reducing the light, to densities of 0.5, 1.0 and 1.5. If the diameter of the fixed diaphragm be accurately 6 millimeters, the diameters of the three diaphragms in question will be 3.37, 1.90 and 1.07 millimeters respectively. To these dimensions the diaphragms should be as nearly as possible drilled, but their absolute accuracy is immaterial, as their real values

will be determined by trial in the photometer itself, as

will be explained later.

At the left-hand end of the photometer is a forked clip, for the purpose of holding the strip of plate during measurement. This clip is pivoted on the top of the photometer, and the necessary pressure is applied by a spiral spring. On the left-hand side of the splayed front of the instrument, and on about the same level as the scale, a small hinged door is provided, a mirror being attached thereto on the lamp side. The object of this mirror is to illuminate the scale by opening the door when observing the readings.

Having described the photometer, it will be well at this point to indicate the Photometer manner of its use. We will therefore in Use assume that we are about to measure the densities of two gradations developed upon a strip of plate. The lamps having been lighted and allowed to become quite steady, we adjust the position of the grease-spot chamber till the two images of the greasespot reflected in the small mirrors are exactly similar. The pointer now indicates on a scale the neutral or equality point from which all measurements are calculated. If the diaphragms in the end of the photometer be of exactly equal value, and the two lamps of exactly equal luminosity, the neutral point will be the true zero of the instrument, marked 1.8 on the scale. This is, however, very unlikely to be the case and is quite immaterial; indeed, it is distinctly desirable to make the diaphragm in the left-hand end of the photometer a shade larger than that in the right, purposely to bring the neutral point nearer the right-hand side. gives a longer range of direct readings, and avoids unnecessary recourse to the supplementary diaphragms. Suppose, therefore, that we find the neutral point, indicating the position of the grease-spot when equally illuminated on both sides, to be 1.4; we next slightly warm the strip of plate, and bring the gradation we wish to measure opposite the diaphragm on the lefthand side of the instrument, where it is held by the forked clip. If we now examine the images of the grease-spot, we shall find that they are dissimilar and that it is necessary to move the little chamber over to the left in order to restore equality. The point indicated on the scale at which equality is restored gives us a second reading, say, 2.9, and all we have to do to determine the density is to deduct the first from the second reading: thus, 2.9—1.4—1.5, which is the total

density of the gradation measured.

We next bring the second gradation opposite the lefthand diaphragm, and we will assume that its density is materially greater than that of the former gradation. We now find that, though we move the grease-spot chamber to the left as far as it will go, we are unable to restore equality. In this case we make use of the largest supplementary diaphragm (value, say, 0.5) at the right-hand end of the photometer, when we are enabled to restore equality by turning the grease-spot chamber back again to the right. Taking 1.4 as the neutral point as before, and supposing that, on inserting the supplementary diaphragm, we obtain a reading on the scale of 3.4, we again deduct the smaller from the greater reading, but, in this case, we must add the Thus, 3.4-1.4+0.5=2.5, value of the diaphragm. the total density of the gradation. Of course, in the case of still higher densities, it will be necessary to resort to the use of the smaller diaphragms.

The determination of the value of the supplementary diaphragms is made as follows: Ascertain the neutral point on the scale when the grease-spot is illuminated by light passing through the fixed diaphragms of the photometer; then bring one of the supplementary diaphragms into position and take the reading when equality is restored by moving the chamber to the right. The difference of the two readings is the value of the diaphragm. In finally deciding the value, it will be well to take the mean of, say, half-a-dozen readings.

While the photometer, as described, is quite sufficient to meet the requirements of the amateur, the platemanufacturer employing our system of speed determination may, with advantage, substitute the Schmidt and Haensch indicator for the grease-spot. Owing to its greater sensitiveness, it expedites the work of reading, but its adoption necessitates a photometer 20 inches

instead of 12 inches long.

SPEED DETERMINATION

We are now in a position to determine the speed and other characteristics of a Exposure plate. Having cut a strip of the plate to be tested and placed it in the dark slide, we proceed to make the exposure behind the revolving disc. If we have a rough clue as to whether the plate be rapid or slow, a little experience will guide us in determing the best exposure to give; but, in the case of a plate of which we have no clue to the speed, 40 C. M. S. may be taken as the longest exposure of the series. A little consideration of the revolving disc will, however, show that, in order to obtain an effective maximum exposure of 40 C. M. S., it will be necessary to continue the exposure for twice 40, or for 80 C. M. S. The reason of this is that the effective exposure only proceeds during half the revolution of the disc, the light only reaching the plate during the passage across it of 180° out of the 360°. An actual exposure of 80 C. M. S. will, therefore, give us a series of nine effective exposures ranging from 40 C. M. S. to 0.156 C. M. S. Though it is preferable to work with the candle at a distance of one meter from the plate, it might be desirable, in order to curtail the exposure, in the case of a very slow plate, to place the candle at a distance of 0.707 of a meter from the plate; the light of the candle, at this distance, being equal to that of two candles at one meter, and thus halving the exposure. The exposure is made by drawing and closing the shutter of the dark slide, the disc being caused to revolve before the exposure commences and kept steadily revolving during its continuance.

Having impressed the strip of plate with its series of nine exposures, we next proceed to develop it, carefully observing the precautions already laid down. A little experience will be required to judge the best time for continuing development, which varies, of course, with different plates. While the densities of the gradations should be well marked, the higher densities should not

be allowed to grow too dense, otherwise there will be difficulty in measuring them. A good development factor to aim at is 1.0, or thereabouts. However long the time occupied in development, it should be carefully noted. After development, the strip is fixed and washed in the ordinary way, and it is well to wipe the surface of the film gently with a plug of wetted cotton-wool. If time be an object, a very short washing will suffice, and the drying of the strip may be hastened by means of alcohol. When dry, the back of the strip should be thoroughly cleansed from any emulsion marks, and the film wiped with a soft cloth. The dividing lines between the gradations should be strengthened with a pen and 111k, as this will materially assist the operator in adjusting the strip in the photometer afterwards.

Following the instructions already given, there will be no difficulty in Measuring and Recordmeasuring the densities of the series of ing Densities gradations. In the examples of measurements submitted, however, it was expressly stated that they represented the total densities. By this is meant not only the density of the deposit resulting from the exposure, but also the density due to the glass and gelatine, and to any incipient fog. For our purpose, it is necessary to ascertain the density of the deposit due to the exposure alone; we must, therefore, eliminate from each measurement such amount of density as is due to glass, gelatine and fog. It is with this object that we protect one-tenth of the strip from light. portion of the strip we term the "fog-strip." In order to obtain the net densities resulting from the exposures alone, we proceed as follows: The neutral or equality point having been ascertained, we bring the fog-strip over the left-hand diaphragm of the photometer, and restore equality by moving the grease-spot chamber to the left; the difference between the readings giving the density due to glass, gelatine and fog.

The following practical example taken from my notebook will show the method of recording the readings obtained in the photometer, and make what has been said more readily understood. In this example it will be noted that the exposures given ranged from 0.312 C. M. S. to 80 C. M. S. and that the developer used was ferrous oxalate.

Neutral point											1.740
Fog point											1.960
Fog (difference	1					٠	٠	٠	-	٠	0 220

EXPOSURE C. M. S.	READING	NET DENSITY 1.960 DEDUCTED	
0.312	2.110	0.150	
0.625	2.235	0.275	
1.25	2.400	0.440	
2.5	2.660	0.700	
5.	3.000	1.040	
10.	3.320	1.360	
20.	3.090	1.665	0.535 added
40.	3.360	1.935	**
80.	3.220	2.160	0.900 added

Developer: Standard ferrous oxalate. Developed: 7 minutes at 65 Fahr.

Development factor: 1.06.

Inertia: 0.54. Speed: 63.

In measuring the densities due to the 20 and 40 C. M. S. exposures, it was necessary to resort to a supplementary diaphragm (value 0.535), and the density due to the 80 C. M. S. exposure required a still

smaller diaphragm (value 0.900).

It will be seen that the density due to glass, gelatine and incipient fog (all included in the term "fog") is obtained by deducting the neutral from the fog reading. The first column gives the series of effective exposures resulting from a single actual exposure of 160 C. M. S. The second column gives the reading of each gradation as indicated on the scale of the photometer; and the third column is the difference between the values given in the second column and the value of the fog point, or the net density resulting from the exposure alone.

The next step is to plot the measure-

Obtaining the Characteristic Curve Curve

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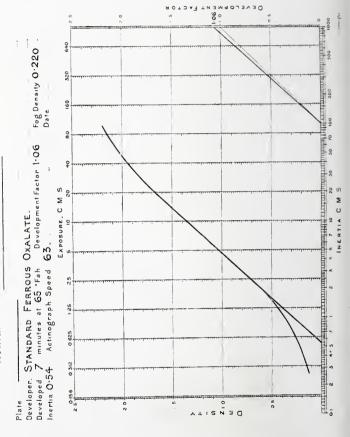
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HURTER & DRIFFIELD'S METHOD OF SPEED DETERMINATION. FIG. II.



illustrated in Fig. 11, but, if preferred, the skeleton form may be scratched on a piece of slate, and the curve plotted with a slate-pencil. Fig. 11 is produced from one of our lithographed charts, and the curve resulting from the measurements just given is plotted thereon. The horizontal or "inertia" scale of the chart may be constructed from the scale of an ordinary sliderule, the scale, however, being repeated four times instead of twice. The density scale on the left hand, and the development factor scale on the right, are precisely alike as regards their divisions and values. vertical measurement of these scales from o to 1.0 should exactly correspond with one length of the inertia scale, say, from 10 to 100, or from 100 to 1,000; the graphic determination of a development factor of 1.0 will then be represented by an angle of 45°. Vertical equidistant exposure lines are drawn at the points 0.156, 0.312, 0.625, 1.25, etc., and they are conveniently divided so as to facilitate the plotting of the densities.

Upon each of the vertical exposure lines we mark the density corresponding to the exposure it represents, and we must then carefully consider the course and position of the straight part of the curve upon which the speed of the plate depends. By holding a piece of thread tightly stretched over the points marked on the exposure lines, the position of the straight line will be readily decided, and it may then be drawn on the chart; the line being continued till it intersects the inertia scale. Occasionally it may be found that one or more of the plotted points do not lie evenly in the path of the curve; this may arise either from an error in measuring the density, or from a false density due to an inequality in the coating of the plate; but, unless in a very extreme case, there will be little difficulty in determining the

course of the curve.

The point at which the continuation of the straight line intersects the horizontal scale indicates an exposure which we termed the "inertia," and which is a measure of the slowness of the plate—the greater the inertia, the slower the plate. The most important practical application of the inertia is that it indicates that exposure

which just marks the commencement of the period of correct exposure. This is not absolutely true, but sufficiently so for all practical purposes; no better means having been found of deciding and expressing the position of the characteristic curve with regard to the ex-

posure scale.

In the example under consideration, the inertia is 0.54. The speed of the plate, which is the inverse of the inertia, is obtained by dividing the factor 34 by the inertia 0.54, and, hence, is 63. The factor 34 is, of course, only applicable when the source of light employed is the standard candle used under the conditions previously laid down. The substitution of another source of light would involve the use of another factor.

We thus see how the position of the characteristic curve on the chart enables us to assign a definite numerical value to the speed of a plate. A value is similarly assigned to the development factor as follows: From the point 100 on the exposure scale, draw a line parallel to the straight portion of the characteristic curve, and the point at which it intersects the development factor scale indicates the value required. In the example before us,

the development factor is 1.06.

LATITUDE IN EXPOSURE

The characteristic curve of a plate thus obtained further teaches us what capacity the plate has for truthful representation, or, in other words, the amount of latitude in exposure of which the plate admits. the example under consideration, it would be quite admissible, in ordinary photographic practice, to consider the range of the correct period as extending from 0.54 C. M. S. (the inertia) to 80 C. M. S., the plate being thus capable of registering a series of light-intensities This is, of course, not absoranging from 1 to 148. lutely true, because we have included slight deviations from the straight line both in the under- and overexposure periods; but these deviations are unimportant, and their influence would never be felt in ordinary pictorial work.

Taking the length of the practically straight part of the curve as including a range of exposures 1: E, and the light-intensities to be photographed as lying between the limits 1: I, the latitude in exposure would be 1: E, and within these two limits, the negatives resulting from any exposure would, if developed together and for the same length of time, yield identical prints. Applying the figures given, as representing the range of exposures covered by the straight part of the curve, and taking the light-intensities of an ordinary open landscape as 1:30, the latitude of exposure permissible would be 1: 148, or roughly, 1:5; that is to say, whether the plate received an exposure of 1 second or of 5 seconds, it would be immaterial. But two negatives of the same subject exposed for these lengths of time and developed together would be very different in appearance. The latter would be generally the denser and would take three to four times as long to print as the former, but the resulting prints would be

practically indistinguishable.

I have in my possession two negatives of the same subject taken upon the same plate and developed together for the same length of time, but the latitude of the plate used was such as to permit of one negative being exposed for ten times as long as the other. While one of the negatives has every indication of a perfect exposure, the other gives to the eye the impression of heavily fogged over-exposure; yet they yield identical prints. The time occupied in printing, however, while quite normal in one case, amounts to two or three days in the other. My object in mentioning this is to point out that a photographer who might inadvertently produce such a negative as the denser of these, would, from its behavior in the developer, probably conclude that he had enormously over-exposed. He would at once stop development, reconstitute his developer, and, on taking a print from the finished negative, flatter himself that the result was due to his skill in development, while, as a matter of fact, the gradations of his negative were true from the outset. In the instance referred to, the image of the denser negative flashed up in the developer far more rapidly than that of the other, and by the time development was completed it was lost in an apparently impenetrable deposit of high density. From this, it is obvious that a system of timing development by the first appearance of the image is fallacious; and, had it been resorted to in this instance, the two negatives would never have yielded identical prints. When two negatives, such as those described, yield identical prints, their density differences are alike throughout, though

the density ratios differ.

On the ground of economy of time occupied in printing, the photographer will, of course, always aim at so exposing that the gradations of his negatives shall commence at the lowest part of the straight line representing the correct period. The best possible negative is one which combines truthful representation with minimum density; but, owing to the difficulty of attaining to absolute accuracy in exposure, the photographer must often be content if he succeed in bringing the gradations of his negatives anywhere within the period of correct representation. The extent of the correct period varies very greatly in different plates; and, as the more limited it is the more absolute accuracy of exposure is demanded, the importance of this characteristic will be appreciated. The latitude of exposure is generally greater in a slow than in a rapid plate, and it is largely dependent upon the amount of silver haloid upon the plate.

RANGE OF LIGHT-INTENSITIES

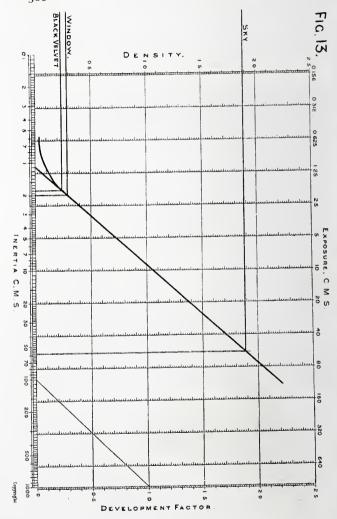
The range of light-intensities reflected by a particular class of subject may be readily determined by the following method. Cut from the center of, say, a halfplate, a piece (A) the size of a quarter-plate, and a strip (B) of the size prescribed for the purpose of speed determination. Upon A take a photograph in the camera of the subject of which it is desired to determine the range of light-intensities; and expose B behind the revolving disc to the standard light. A and B must then be developed together for exactly the same length of time. When fixed, washed and dried, we proceed to measure the densities of the strip B and to plot them

upon a skeleton chart, just as in the case of a speed determination. We also very carefully measure the densities of the highest light and the deepest shadow yielded by the negative A, and mark their position on the curve representing the densities of the strip B. From



these two points we draw vertical lines till they intersect the horizontal exposure scale. The ratio of the two exposures thus indicated is the range of light-intensities in the subject photographed. Fig. 12 is produced from the negative of a subject which may be regarded as typical of a landscape with a decidedly wide range of light-intensities. The sky affords the highest light, and the dark reflection in the window the deepest shadow. As the window is illuminated only by diffused light, and is

THE PHOTO-MINIATURE



in close proximity to the camera, its dark reflection represents a dark object in the close foreground. The gradations shown on the upper side of the photograph are printed simultaneously with the picture itself from the strip exposed to the standard candle. The densities of this strip, being produced by known exposures or light-intensities, provide a scale which enables us to assign a value to the intensity of the light which yielded any particular density upon the picture negative itself. Fig. 13 shows the plotting of the densities of the strip B. The densities representing the sky and the reflection in the window are indicated by horizontal lines, and the vertical lines intersecting the exposure scale show the equivalent exposures to be 2 C. M. S. and 58 C. M. S. respectively. The extreme range, therefore, in

this subject is only as 1:29.

In seeking to determine the range of light-intensities in a particular subject, it sometimes happens that it is difficult to secure a patch of the highest light or deepest shadow of sufficient area to admit of being readily measured in the photometer. In such a case, we proved experimentally that a sheet of pure white cardboard and a sheet of matt black paper, or a piece of black velvet, suitably disposed with regard to illumination and to distance from the camera, may be safely introduced. piece of pure white cardboard, for instance, illuminated by direct sunlight, and placed at a distance from the camera of not less than, say, 100 times the focal length of the lens, would yield a density equal to that produced by the sky under the same condition of illumination; while a piece of black velvet, at close quarters and illuminated by diffused light, would adequately represent the deepest shadow which would occur in an object similarly situated. In Fig. 12, a piece of black velvet is included on the left-hand side, and a measurement of the density it yielded is equivalent to a lightintensity of 1.8 C. M. S., or to a slightly less intensity than that of the dark reflection in the window. The extreme range, therefore, from the sky to the black velvet is as 1:32. In making experiments of this kind, it is necessary to employ slow plates having as extended a period of correct exposure as possible.

Exception has several times been taken to our statements as to the range of light-intensities in an ordinary open landscape. While, however, we have submitted proof of the accuracy of our contention, our critics have been satisfied to advance mere opinions. If the exaggerated views they hold upon the subject were correct, truthful representation by photographic means would be an impossibility. There are many plates upon the market which would be taxed to the utmost in truthfully representing even so narrow a range of light-intensities as 1:30.

FREE BROMIDE IN THE FILM

We have thus far only considered it necessary to expose and develop a single strip of plate in order to determine its speed. In the case of an unknown brand of plates, however, there is always the possibility of the presence of a disturbing element in the film which would cause a single determination to be more or less mislead-This disturbing element is free bromide, the influence of which is to cause the inertia to decrease with time of development, until a certain development factor is reached, when it is no longer felt. While, however, it rests with ourselves to avoid the use of bromide in the developer, its presence in the film is beyond our control, and, in view of the serious objection to its presence, it is greatly to be desired that plate-makers will realize the importance of securing the elimination of free bromide from their emulsions.

In Fig. 4 it will be noted that the two characteristic curves resulting from different times of development have exactly the same inertia. The speed of the plate might consequently have been accurately determined by the measurements of either strip alone. If free bromide were present in the film, however, the inertiæ of the two strips would not be coincident; in other words, the speed of the plate would vary, more or less, with the development factor reached. For this reason, it is always better to simultaneously expose two strips of the same plate, developing one, preferably, for exactly twice as long as the other. If, on plotting the measure-

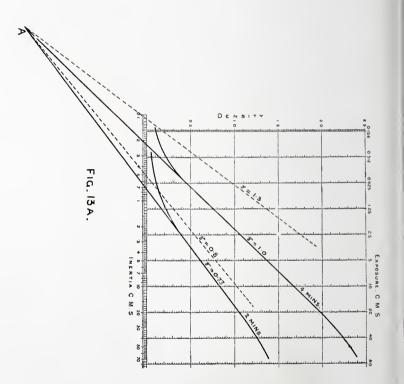
ments of the two strips, we find the inertiæ practically coincident, we may infer the absence of free bromide in the film, and regard the speed as determined. If, on the other hand, the inertiæ do not coincide, the presence of free bromide would be indicated, and the speed of the plate would be dependent upon the development factor reached. In the latter case it would probably be sufficiently accurate for all practical purposes to take, as the true inertia, the mean of the two determinations; though, should the discrepancy be very marked, it might be advisable to modify the speed according to the development factor to be reached.

The time occupied in the development of the first strip must be determined by the facility with which the plate develops, but the longer the time the better, so long as the second strip, on receiving twice the time of development, does not become too dense to be readily

measured.

In an extreme case, the influence of free bromide in the film is so marked as to absolutely necessitate a recognition of the varying speed of the plate as dependent upon the development factor to be reached. It will, therefore, be useful to indicate how the variations in the speed of such a plate may best be determined for any desired development factor. Fig. 13A represents one of the most marked cases met with by the writer. The two strips simultaneously exposed, but developed for 2 and for 4 minutes respectively, gave development factors of 0.73 and 1.0. Had there been no free bromide present, the inertiæ yielded by the two strips would have been coincident, and the speed, in consequence, constant; but in this instance the inertiæ are 0.75 and 0.22 respectively, so that the speed varies from 45.3 to 154.5 for the two development factors obtained. In the instance under consideration, the straight portions of the curves, instead of originating from a point upon the exposure scale, originate from a point marked A, considerably below it. The point A is, of course, obtained by producing the straight portions of the two curves until they intersect.

Let us now consider how the speed of this plate would vary accordingly as it might be required for the



production of a portrait, an interior or a landscape, to be developed respectively, say, to factors 0.8, 1.0 and 1.3. As it happens, the inertia for development factor 1.0 is already determined, and we obtain the inertiae corresponding to the factors 0.8 and 1.3 by drawing lines, as dotted, from the point A at angles corresponding to the two development factors in question. The points at which these lines intersect the exposure scale give the respective inertiae, which, divided into 34, give the speeds required. The speeds and their ratios corresponding to the three development factors are therefore as follows:—

DEVELOP- MENT FACTOR	INERTIA	SPEED	SPEED RATIO
0.8	0.52	65	1.00
1.0	0.22	154	2.36
1.3	0.11	309 .	4.72
	MENT FACTOR O.8 I.O	0.8 0.52 1.0 0.22	O.S O.52 65 I.O O.22 154

From this it will be seen that the plate is nearly five times as rapid for a landscape as for a portrait. It may be well, however, to remark that, as a matter of fact, this particular plate is incapable of reaching a higher development factor than 1.0, but it serves to illustrate the principle and method to which it is my object to call attention.

CONTROL OF THE DEVELOPMENT FACTOR

Apart from the reason just advanced, another very important object is attained by the simultaneous exposure of two, instead of a single strip. By this means we obtain data for the control of the development factor; that is to say, we learn how to modify the time of development so as to adapt the range of our negatives to the subjects photographed and to the particular effect we wish to produce.

In order to determine the time required to reach any desired development factor, we have only to ascertain the development factors yielded by the two strips. These factors are then plotted upon another skeleton

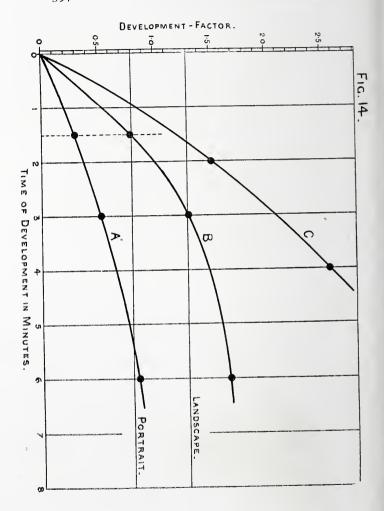


chart as illustrated in Fig. 14, the two developmentfactor values, together with the zero point, affording us three points through which a curve is drawn which represents the growth of the development factor with time of development. This curve then enables us to ascertain the time required to reach any desired factor.

In Fig. 14 three development-factor curves, A, B and C, are plotted, and they serve to show the great difference which exists in different plates as regards the growth of this factor. The numerical data determining the curves are given in the following table, and the relative times of development required, in each case, for a portrait and an ordinary open landscape, are also indicated. The development factors indicated for these two classes of subjects are, of course, given quite provisionally. The dots marked on the curves indicate the values of the factors ascertained, which, with the zero point, determine the course of each curve.

PLATE	STRIPS DE- VELOPED minutes	DEVELOPMEN F FACTORS OBTAINED	Time of Development for	
			PORTRAIT minutes	LANDSCAPE minutes
A	112, 3, 6	0.29, 0.52, 0.85	5 - 5	-
В	112, 3, 6	0.8, 1.32, 1.675	1.5	3 ·
C	2, 4	1.52, 2.58	0.95	1.65

Taking the two extreme curves, A and C, it will be be seen that while, in the case of A, a portrait would require 5 ½ minutes' development, the same result would be obtained on plate C in rather less than 1 minute; and, as the curve A clearly approaches its limit, the plate it represents would probably be useless for landscape work, or for any subject requiring a more extended range of opacities than a portrait. It is to be hoped that it will come to be recognized as a characteristic of a really good plate that it shall, unlike plate A, be capable of attaining the highest development factor demanded in practical photography.

The photographer who elects to work in accordance

with the principles laid down in this little work is advised to decide upon a really good brand of plates, and, having done so, to obtain a sufficient supply, say, for a season's requirements, taking care that the whole are coated from the same batch of emulsion. A single careful determination of the characteristics of his plates will then provide him with data which will enable him to apply them in practice to the best ad-

vantage.

The ground which I proposed to traverse in this monograph is now covered, and I trust that the principles underlying our quantitative system of photography, and the directions for their practical application, have been sufficiently clearly laid down to enable any photographer, who may desire to do so, to put our system into practice. Opposed we have always been by photographers who prefer to attain their ends by empirical methods rather than pursue a scientific course, which, if faithfully followed, leads directly to success. It has, however, been gratifying to note a growing tendency to adopt scientific methods. This has been especially marked in connection with color photography, in which it is of such vital importance to secure the three fundamental negatives in relatively correct relationship. accuracy in the exposure and development of negatives for color and other branches of technical photography be found to be essential, it is essential also, though perhaps in a less degree, in ordinary photographic prac-

The production of a photograph is governed by natural laws, and a definite effect must result from a definite cause. The same cause, under the same conditions, always produces the same effect. The law which governs the action of light upon the sensitive plate teaches us that only a limited range of such action is available in photography if truthful representation be demanded; and, hence, the necessity of accuracy in exposure. Having, by means of a correct exposure, produced a latent image true in the relationship of its gradations, the developer enables us to produce a metallic image, of which the gradations shall be equally true. The developer employed, however, must be so constituted that its

exact effect can be predetermined, and no developer will comply with this demand which does not act in conformity with the law of "constant density ratios." Only by clearly grasping and working in harmony with the laws governing the action of light and the action of the developer, can we really become masters of technical photography.

I earnestly hope that this little work may be the means of inducing some amateur photographers to take up the scientific method, and I feel very confident in assuring any who may do so that they will discover a new field of unexpected pleasure in the pursuit of photography.

Widnes. Eng., November 15, 1903. VERO C. DRIFFIELD.

Potes

PHOTOGRAMS OF THE YEAR 1903. A Pictorial and Literary Record of the Artistic Photographic Work of the year. Compiled by the staff of *The Photogram*. 172 pp.; 6½ x 9½ in.; 152 illustrations. Paper covers, \$1.00; cloth (Library) edition, \$1.50. London: Dawbarn & Ward Ltd. American agents: Tennant &

Ward, New York.

The splendid series in which Mr. H. Snowden Ward and his co-workers have preserved for us an illustrated record of modern pictorial photography is notably enriched by this handsome volume-the ninth of the The book opens with a clever example of decorative work by Tulloch Chevne. Facing the "Acknowledgement "page is a reproduction of Chas. Job's "On the Arun," exhibited at the Salon, which faces a decorative flower-piece by J. Horace McFarland. Review of Photography in France, delightfully written by Robert Demachy, is preceded by a charming figure portrait by W. Crooke. The Review, of course, is itself illustrated with recent French work, Puvo, Darnis, Le Begue, Demachy, Laguarde, Grimpel, Ecalle, Bucquet and other noted pictorialists being represented. This is followed by a paper in which Frederick H. Evans, perhaps the leading worker in architectural photography today, discusses and analyzes four of his pictures reproduced with the text. It would be difficult to overestimate the practical value of this one paper, in which a master gives us a constructive criticism of his own work.

Pictorial Photography in the United States (Eastern and Middle States) is cleverly handled by Osborne I. Yellott. Under existing conditions the selection of Mr. Yellott for this work was altogether a happy choice, assuring an intelligent and discriminating review with-

NOTES 399

out the personalities so much in evidence in preceding volumes. We are especially glad to see that Mr. Yellott gives a fair proportion of his space to professional work. Thus, in addition to examples by Clarence H. White, T. M. Edmiston, Dr. Detlefsen, H. A. Hess, F. C. Baker, Miss Prall, John Beeby, S. L. Willard, Henry Hall and other well-known amateurs, we have also reproductions of the professional work of B. J. Falk, Pirie MacDonald, Mathilde Weil, R. Eickemeyer, Jr., Gertrude Käsebier, Arthur Hewitt, W. B. Dyer, Frances B. Johnston, Zaida Ben Yusuf, A. L. Coburn and others.

The "Suggestions to Would-be Picture-makers" by H. Snowden Ward, which formed a noteworthy contribution to *Photograms of the Year 1902*, are this year amplified and continued, with many diagrams. The value of these two papers cannot be indicated by a few words of general praise; they must be seen and read. No picture-

maker should overlook the help they offer.

Pictorial Photography in Germany is this year contributed by F. Loescher, the editor of Photographische Mitteilungen. It is profusely illustrated with suggestive examples and makes interesting reading. Australian Notes, by J. Hill-Griffiths, tell of the progress of photography in that far-off corner of the world and are, of

course, illustrated with Australian work.

Lack of space compels us to dismiss the remaining half of the volume with a mere mention of its contents. Here we have a retrospect of "The Work of the Year" and detailed reviews of The Photographic Salon and the Exhibition of the Royal Photographic Society. These are illustrated with a numerous collection of photographs contributed by workers known and unknown to fame. They cover every department of pictorial photography and, by their individual interest and suggestion, offer keen enjoyment to those who care to watch the evolution of the picture-maker in photography.

A last word should be devoted to the marked improvement seen in the outward appearance of *Photograms of the Year*. Coated paper has been used throughout and the plates are well printed, so that we get a much closer approximation to the originals than was

possible in preceding volumes. A new cover design and more substantial bindings are also provided. Taken altogether, *Photograms of the Year 1903* is a book which every one interested in pictorial photography should see and study, unique in its interest and, at the price, a marvel in photographic bookmaking.

A

WINTER. Pictured by Rudolph Eickemeyer, Jr.; 50 pages; 10 x 14 in., 54 engravings from photographs. Paper boards, \$2.00. New York: Harper & Bro.

As a holiday gift for a picture-lover it would be difficult to find a volume more appropriate to the purpose and season than this collection of 54 winter pictures by Mr. Eickemeyer, in which the ever-changing moods and delights of winter-time are portrayed with admirable skill and feeling. As a revelation of the pleasures of serious photography, and as a demonstration of how these pleasures can be made profitable, the book is worth many times its price to any photographer worthy of the name. Need we say more to heartily commend the book to every reader of these pages?

A

The catalogue of the Third San Francisco Salon, 1903, profusely illustrated with halftones in color, individually mounted, attractively printed and bound in a dull red-brown cover of exquisite tone and texture, is an example for all who hereafter essay the gentle art of catalogue-making. Copies can be obtained, we believe, at the modest cost of 35 cents, from the Secretary of the Salon, Mr. Charles A. Goe, Mark Hopkins Institute, San Francisco.

Incidentally, we may mention the fact that the Salon itself, held last October, was completely successful and gave unbounded pleasure to those privileged to visit it.

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The literary contents include a critique on the principal British exhibitions, and on the non-exhibited works, by A. C. R. Carter; a continuation of the "Hints to Would-be Picture Makers," by H. Snowden Ward; an Analytical Criticism of four of his own works, by Frederick H. Evans; and articles on the French School, by Robert Demachy; the German School, by Fritz Loescher; the American School, by Osborne I. Yellott and by Carl E. Ackerman; the Australian Work, by A. J. Hill-Griffith, etc.

To those who have not been able to visit the exhibitions it is indispensable, as form-

ing the only effective substitute.

To all interested in Pictorial Photography it is a highly interesting and educative volume, enabling the student to compare the different "schools" and exhibitions. Perhaps the most useful of all its functions is the introduction of new work by unknown workers, and this has been done more largely in 1903 than in any former year.

To art lovers in general it appeals strongly as one of the most attractive art publications of the year. To look through it is to delight the eye: to study it is to receive an

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objects against a bright sky the same effects would be obtained. Take, for instance, the twigs and limbs of trees through which a strong light is shining. With the ordinary plate a sort of haze or halo appears that destroys all the beauty and detail, while with





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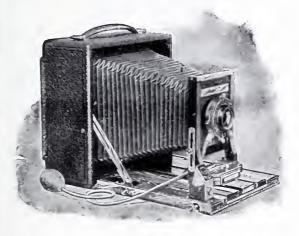
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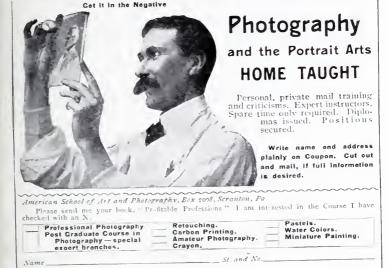
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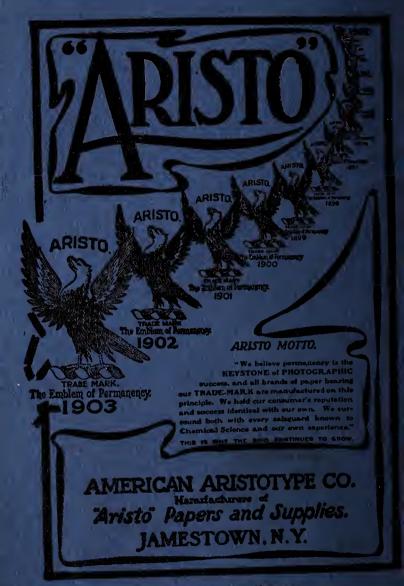
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Vel. V. No. 55. October, 1903

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The Photo-Miniature

A Magazine of Photographic Information

Volume V

OCTOBER, 1903

Number 55

ARCHITECTURAL PHOTOGRAPHY

Photography in its broadest interpretation is both an art and a science, and if we inquire into its multitudinous applications we cannot but admit that in few of its utilities has it rendered greater service or been of

better assistance than in architecture.

The artist finds in photography a means of expression for his appreciation of the beautiful; the scientist welcomes it as a faithful ally, a helpmate to assist him in his researches; but to the architect, photography is both a pleasure and a necessity. By its aid the greatest masterpieces of art have been rescued from oblivion, -for pictures may be and are faithfully copied,-but no patience or skill of man can ever reproduce in black and white the stupendous works of the great epochs of architectural evolution. The best work of the most skilful architectural draftsman can only approximate the correctness of perspective, the fullness of detail, the accuracy of the curvature and the complete subordination of the detail to the general effect of a well-made photograph. By means of photography the architect of today has within his reach a veritable panorama of the architectural world, which is of inestimable value to him in the preparation of his designs, and is able to bring together into intimate comparison the different styles, and to put side by side transcripts of all the buildings that can offer him suggestions. With a good collection of photographs an architect makes the range of the entire architectural world with an accuracy and fullness of observation utterly impossible without photography.

But for a work to be of value it is imperative that it be properly executed, and if these masterpieces of ancient times be badly represented a great portion of their educational value is lost. This branch of photography has been sadly neglected; a perusal of our architectural journals makes apparent the lack of proper knowledge necessary for this special work. The purpose of this little book is to offer a few suggestions whereby the photographer may better his efforts and, by diligent and intelligent practice, bring his work to a high standard of perfection, producing results creditable alike to the architect, the designer and himself.

Requirements architectural photograph is true and perfect perspective. Too much stress cannot be laid on this point, for it is the foundation of the picture, the skeleton, as it were, on which the structure is built. The ancient Greeks gave certain horizontal curves to their temples to help the vision and give them grace; to this day, architects, in preparing their designs, keep the fact in view that their structure is to be seen from certain points, and modulate their lines to that effect. It is the duty of the architectural photographer to interpret these lines in a truthful and

intelligent manner.

Aërial Ferspective two parts: Aërial and Linear Perspection. Aërial perspective properly belongs to the painter and consists in giving due diminution to the strength of light, shade and color of objects, according to their distances; to the quality of light falling on them, and to the medium through which they are seen by the observer.

Linear
Perspective

Briefly defined, linear perspective is the art of representing objects on a plane surface, so that a picture shall present to the eye precisely the same appearance as the

object itself viewed from a given point.

This axiom, if closely followed, will, of itself, materially advance the standard of work to a high degree of perfection; for the angle of vision included by the eye, or that which can be clearly discerned without

straining the eye, is one productive of very pleasing perspective. Yet, in photography, this definition of perspective is somewhat misleading; the angle of the lens usually employed being often at variance to the normal angle of vision, resulting in perspectives which are untruthful and displeasing to the cultivated eye.

The architectural draftsman can, by certain geometrical set rules and the skilful manipulation of his lines (he having almost unlimited freedom), attain pleasing results. With the photographer it is some-what different. The one deals with the imaginary, the other with actuality. The photographer has these three cardinal points to observe: the horizon, the relation of the point of sight to the sides of the building, and the proximity of this point to the object. Each of these propositions will be studied separately.

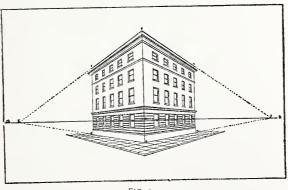


FIG. 1

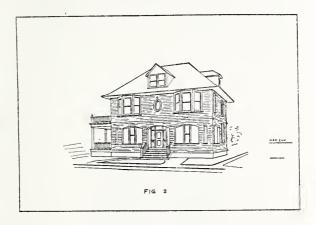
We will first familiarize ourselves Perspective with perspective lines in detail. In the Lines diagram Fig. 1, we have the outline of a building, with its lines projected to better illustrate the text. The horizon line, A B, is that line on a level with the eye and to which all other lines above and below it are seen to converge. In some instances there may be a single set of lines, as when we look along only one

side of a street, or these may be double and converge in two opposite directions (Fig. 1), for instance, at the intersection of two streets and when the eye embraces the two sides of a square. These convergent lines. whether single or double, are known as vanishing lines, and their meeting place on the horizon is the vanishing The position at which the eve of the observer is situated is at the intersection of the horizon line and the corner line of the building. We must note that the horizon line is always on a level with the eye, and, although the angles of the vanishing lines may change, the horizon always remains the same in relation to the eve. and can be relied upon as being the plane from which the object is viewed. This point of sight is all-important in an architectural photograph, and regulates not only the position of the horizon, but also the angles of the vanishing lines. The point of sight may be situated below the object so that all lines converge in only a downward direction, the upper lines being more acute than those below them; or the lines may converge in an upward and downward direction, as in Fig. 1; and again they may run with only an upward sweep, as in a bird's-eye This can be illustrated in a practical manner if we stand close to a long train of cars, first placing the eye along the rails and noticing the downward sweep of all the lines of the cars, then slowly ascending the platform until the roof is reached, always keeping the eye on the vanishing point or meeting place of the top and bottom lines of the cars. We then notice that this vanishing point on the horizon is a sort of pivot to which all vanishing lines concentrate and remains unchangeable on the horizon, although the direction of the vanishing lines will vary according to the position of the eve of the observer.

Location of the Horizon

Having now a clear conception of the principles of perspective, we will inquire into their practical application. The location of the horizon line is left to the taste of the photographer, and must depend on the nature of the subject to be represented. Speaking broadly, it should be borne in mind that a low horizon tends to heighten the building and a high one to flat-

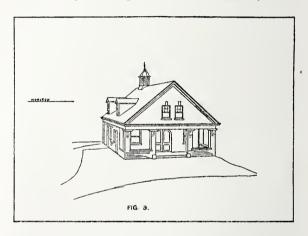
ten it. These simple principles, judiciously employed, will be of great benefit. If, for instance, the appearance of magnitude in a building or majesty in a monument is required, the choice of a low horizon is best; but this must not be pushed to extremes, for, if the



point of sight is taken too low, the ground seems to rise and the building appears as if on a hilltop. For an ordinary edifice the height of a person's eye from the ground is a very good position (Fig. 2).

For the modern tall office building a The Modern viewpoint may be taken at a much higher Office These edifices are usually elevation. Building designed in the relative proportions of the orders of architecture,—that is: the lower stories represent the pedestal and base; the longest unobstructed height or intermediate stories the shaft of the column, the upper floors being devoted to the frieze and cornice. Fig 4, showing a station-point on a level with the second or even the fourth story for a very high building, is very pleasing, bearing the same position in relation to the building as would one taken from the usual height of a person's eye to a well-proportioned design of a classic order of ordinary dimension. A good plan is to select a point of sight from the ground, but removed to a distance of fully one and one-half times the height of the building. Unfortunately, as structures of this character are usually on business thoroughfares where ground is too valuable to remain unoccupied, the opportunity of photographing them in this manner very rarely exists.

Should a point of sight be taken about midway in the



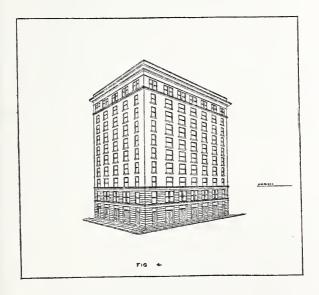
height of a building, the cornice and base-line become of the same length and angles and the picture suffers; but a viewpoint should never be taken at an extreme elevation (Fig 3). An edifice taken under these conditions assumes a flat, low, distorted appearance, being viewed from a point from which it was never intended to be seen, much less photographed.

Relation of Viewpoint to Sides of Building

Let us stand at a street corner and glance at a building on the opposite side, in such a manner that only one front is seen. We perceive that all horizontal lines appear parallel. If we

now move slightly until the other side comes in view,

this will have its lines running to a vanishing point. If we continue to walk around the corner, we will finally notice that, when the side which we had first seen disappears, the lines of the side directly opposite have assumed a parallel horizontal position similar to what was seen from our original station-point. This.



then, is the second position of importance in choosing

the viewpoint for our picture.

Under this heading three conditions present themselves: buildings showing two of three sides; others where only one elevation appears, as, for instance, a store-front located immediately between two other buildings, and edifices where the sky-lines demand special attention.

In general, all buildings having more than one elevation appearing on a street are designed with a view of giving more prominence to one of the sides, and the photographer should so station himself as to show this side to the best advantage. It should occupy the larger portion of the picture, yet not to the detriment of the minor side, whose vanishing lines should not be allowed

to be too abrupt, or distortion may result.

A very objectionable position is to station the camera directly in front of the building. This gives rise to what is known as one-point perspective, that is, all vanishing lines meet at a common point at the lower center of the picture, leaving the horizontal lines level, and losing all the effect of perspective. The point of view should always be taken a little to one side of the building, so as to show the returns of the moldings and the projections of the ornaments. Another position to be strenuously discouraged is one which shows equal portions of front and side, making the corner a dividing line, as it were, and often, especially if there is a hip-roof, giving the building a low, squatty appearance as shown in (Fig. 1).

In certain buildings, such as residences, churches, etc., the sky-lines become of great importance and must be given most careful consideration. Here we must strive for a good tout ensemble, the towers, domes, gables, dormers, etc., being made to harmonize. It is better to sacrifice unimportant details which, though good in themselves, would, if included in the picture, disturb the contours of the other lines and destroy the beauty of the picture viewed as a whole.

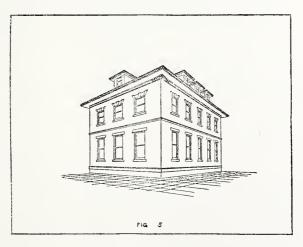
The Proximity of the Station-point to the Object

The eye has a range of vision of about one hundred and twenty degrees, in other words about sixty degrees on either side when looking forward. Only the central portion will appear distinct, all

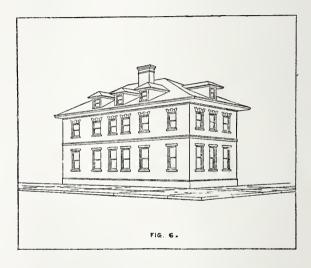
other objects becoming very hazy before the limit is reached. Hence, with our limited scope of clear vision, we are unable to grasp the entire object, as does the glassy eye of the camera, which makes all lines included within the angle of view appear with an unnatural sharpness. By placing the camera at a point where the whole building is seen with reasonable clearness by the eye, we secure a correct and pleasing perspective.

There is little to fear in stationing the viewpoint far away from the object, provided, however, that this distance is not too remote. In general, about three times the height of the building is a distance giving good results.

If the point of sight is taken too close, violent, sharp vanishing lines occur which may cause distortion and often destroy the whole character of the building. greatest defect occasioned by a viewpoint taken too close to the object is when the building has a projecting cornice which, when taken in this position, often obstructs the view of everything above the roof. illustration of this kind is shown in Figs. 5 and 6, these drawings being made from photographs. shows the structure photographed from a station close



to it. It will be noticed that, while the lines of the building are not extremely acute, it appears to be without a roof, even to the small dormers above it; and the sky-lines, so important in architectural rendering, are entirely obliterated. In Fig. 6 we see the edifice taken from a proper distance and giving a very pleasing effect. There was a time when the architectural photographer's outfit was a very trifling affair. An ordinary view-camera, a rapid rectilinear and a wide-angle lens were all the instruments which he deemed necessary. The work was often undertaken by inexperienced amateurs or irresponsible portrait photographers, who considered archi-



tecture only as a side-issue of their business. Today conditions are different, and the profession has risen to the fact that architectural photography requires as much special attention as portraiture.

We will consider the apparatus according to the requirements of the individual operator, i. e., the professional photographer, the amateur, and the architect

who travels for study.

The most important instruments of the professional photographer are his camera and lenses. The severe requirements of modern architecture demand a special camera

in order to properly interpret the different styles. The ordinary "view" camera is suitable for small buildings or monuments of low altitude, but the cone bellows usually fitted to this class of cameras has the disagreeable knack of blocking out portions of the picture if the front-board is raised, and at times, if a short-focus lens is employed, to render it an impossibility to use the swing-back to obtain rectilinear lines.

For the Professional is one with square bellows of no unusual length and affixed to a stationary front frame. This should be of sufficient height to permit the front-board to be raised or lowered in its slide, independently from the bellows, which remain stationary. In this manner, no matter how much the front-board may be raised or how short the focal length of the lens, there is no danger of the bellows obstructing the rays of light on their way to the plate or the folds of the bellows packing together and interfering with the operation of the swing-back.

The camera should be fitted with
Swing-back double swing, both swings permitting a
large angle of inclination and hinged or
pivoted at the center. This latter detail is very important, as it greatly facilitates the working of the lens.
The back must of course be reversible and held by
stout springs. The camera should also have a rack-andpinion movement, either front or back as the operator
may prefer, and should rest on a solid bed.

For the Amateur Amateurs, or those who indulge in general landscape work, but who are called occasionally to photograph buildings, will find an excellent instrument in the ordinary "view" camera, although even here the grace and beauty of the cone bellows should be put aside for the bulky appearance of the square ones. The camera as usually manufactured will answer very well for general architectural work on small edifices or where a long-focus lens can be employed, but has disadvantages where a tall building in close quarters requires a wideangle lens; in fact the ordinary view camera in such cases is a practical impossibility.

For the Tourist

The camera for the architect or draftsman who travels should of necessity be compact, yet possess in a minor way all the conveniences of the large camera. A hand-camera of the folding type will naturally suggest itself as being most suitable, but the greatest drawback to cameras of this nature is the very limited angle of adjustment for the swing-back, which is so necessary to obtain rectilinear lines in a picture. Hence, in selecting a camera, the architect should consider this as one of the most important features of his instrument.

The swing-back, in all cameras for Levels architectural work, should be provided with a double level, both vertical and horizontal. There are several now in use, each with its advantages and defects. Perhaps the simplest and probably the best is the ordinary plumb-line, though its efficiency is very much hampered in exposed situa-The spirit-level is tions with a strong wind blowing. good, but its adjustment is a delicate operation at times. The swinging level, i. e., the metal needle screwed to the sides of the camera, answers the purpose very well when only vertical lines need to be plumbed, and in the hand-camera, the little round lead pellet placed on the ground-glass, whose surface is slightly hollowed at the center, appears to fill all requirements.

In selecting the ground-glass or fo-Ground-glass cusing-screen, a very transparent glass of fine texture should be chosen. The obscurity of some interior work demands a glass of this character. A vertical and a horizontal line should be drawn on it, intersecting at the center of the glass, and it is also advisable to mark off the different size plates to serve as a guide when photographing with plates of a smaller size than that for which the camera was originally designed.

The shutter I use for architectural work is the Bausch and Lomb time and instantaneous registering variety, provided with an iris diaphragm, which can be set without opening the shutter. These shutters are not exceedingly rapid, but architectural photography does not require ultra-

rapid exposures. The special feature which commends these shutters for our purpose is that by means of the iris diaphragm one can graduate the size of the aperture. In operation the shutter is noiseless and without jar, thus avoiding possible vibration.

As regards the tripod, daintiness must The Tripod be overlooked, and we should choose a strong, serviceable instrument which will support the heaviest camera without danger of vibration. It is essential that it be made with telescoping parts, and the ends have sharp points which can be tipped with rubber when photographing interiors or working on slippery pavements. A valuable accessory for securing rigidity in difficult positions indoors or outdoors is Mellen's tripod stay.

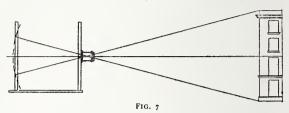
When setting up the camera prepara-Setting up tory to making an exposure, we must the Camera first give thought to the proper placing This should be so fixed that two of the of the tripod. legs are spread in front and the third immediately under the back of the camera. In this manner the camera can be tilted, raised and lowered or shifted sideways at will by simply moving the rear leg of the tripod Some will argue in the direction which we desire. that in a tripod so arranged the rear stick interferes with the free movement of the operator, but this is of little importance compared with the many advantages gained and the ease with which the camera can be set to any position.

Another important detail is the placing of the camera so as to obtain rectilinear lines in a building. Here the swing-back comes into play. Let us get a clear

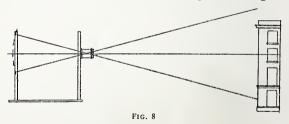
grasp of its purpose and uses.

We will suppose the camera set up Operating the with its base horizontal and the front Swing-back and back at right angles to same (Fig. 7). The axis of the lens will be in the center of the ground-glass. If we desire to include more of the sky or foreground, the front-board is raised or lowered at will (Fig. 8). For ordinary landscape or small work, the range of the rising and falling front will be sufficient, but in architectural work a much larger angle is

required. To obtain this the camera must be tilted, that is, the front of the base raised to such an angle as will suit the subject and the swinging back pushed forward. Here we encounter our first difficulty, for the

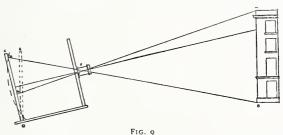


moment that the axis of the lens is changed in relation to the ground-glass and the walls of the building, the normal passage of the light rays is disturbed and distortion of the image is the natural sequence; and the image in this condition, though absolutely true, will appear false to the eye. This is explained as follows: All flat surfaces, as viewed by the eye, recede from it and diminish in size as they recede. This is readily observed with all horizontal lines, and, though vertical lines are subject to the same laws, the fact is not very apparent, for the reason that the eye from earliest infancy is unconsciously trained to recognize rectangular



objects. Even when such are viewed obliquely by raising the eye, we see not what the eye actually records, but what the brain tells us is correct. Not so with the unerring eye of the camera. If the object photographed is a tall building and the lens has to be tilted to include

the top, the vertical point of sight will then be above the natural horizon. The walls of the building will no longer be at right angles to the axis of the lens, but recede obliquely from it. The face of the building is now a surface receding from the point of sight and the lines which bound it will no longer appear parallel, but converge to a vanishing point above the station-point, so that the building assumes the appearance of a truncated pyramid. In other words, the vertical lines have vanishing lines and a vanishing point situated above the building, in the same relation as the horizon line has its vanishing lines and points for the sides of the building. This principle will be thoroughly appar-



ent if we place ourselves in close proximity to the base of a high building and glance upward. The vertical lines will be seen to converge and, if projected, would meet at some point in the sky above the building.

But what effect has the tilting of the camera upon the working of the lens? By referring to Fig. 7 we note that the axis of the lens is at right angles to both the walls of the building and the ground-glass of the camera; the rays of light above and below this axis are of equal length and the object is correctly rendered, both visually and geometrically. But the moment that the camera is tilted and the axis of the lens directed at an oblique angle to the walls of the building, the conditions are changed and the lines above the axis are of different lengths from those below it, the former being lengthened and the latter shortened (Fig. 9). In accordance with the laws of optics, objects situated near

the lens require a longer focal length than those farther removed, and an object taken at a great distance will be smaller and consequently have its rays more contracted than an object taken at close range, which is attended with greater dispersion of its rays. When these two conditions happen in the picture when taking vertical lines, the lines connecting the near and distant points cannot be parallel, but converge. This gives rise to what has been incorrectly termed "distortion of the image"; and the so-called distortion, though absolutely correct, is not recognized by the brain. It is the mission of the swing-back to equalize the unequal contraction and dispersion of the rays of light after they pass through the lens. By pushing the top of the swingback toward the lens, the rays forming the top of the building are made to diverge until the lines are parallel, and, as a matter of fact, the whole scheme of perspective has been altered, the lines having been raised or lowered, extended or reduced, in order that we may view the object as we are accustomed to see it.

Illustration Fig. 9. The line A B represents the wall of a building, C D the ground-

glass of the camera at right angles to the axis of the lens, and DE the ground-glass parallel to the wall of the building, the lens being at F. The point A, or top of building, being farthest from the lens F, will have a shorter focus at G than the point B, or base of the wall, which is closer to F, and whose focus will be longer at H, and consequently all objects will be smaller at G and gradually enlarge as they approach the point H. By the use of the swing-back this effect is entirely eliminated, and in placing it on a line parallel with that of the walls of the building, the different foci are equalized, and all parts in the building have a relative focus which destroys the so-called distortion or perspective, and the vertical lines are rendered parallel.

From the foregoing we may deduce the following rule: For an object to be visually correct, the ground-glass and swing-back of the camera must be parallel with the walls of the building, or at right angles to the

horizon.

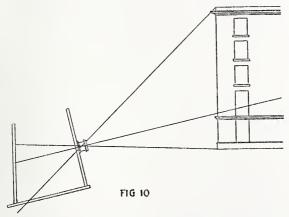


Detail Work - Residential Henry C. Delery



Semi-public Work—A University Building Henry C. Delery

Definition Definition oblique angle to the axis of the lens, another serious difficulty arises, i. e., the irregular sharpness of the image. The picture formed by the lens is projected on a curved surface, as shown by the dotted lines in Fig. 7. This curvature has, to a great extent, been corrected in modern lenses, which are said to possess a flat field. It is evident that as long as the axis of the lens is at right angles to the ground-glass the focal rays will be of equal sharpness, and when the back is swung from this position, blurring

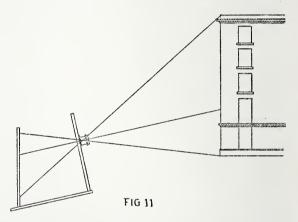


of the image will result. Another fact is that the image is always sharper at the center, and gradually becomes indistinct toward the edges until it ceases entirely. Hence it is necessary to keep the picture plane of the image as near as possible to the center of the plate. If a building is photographed as shown in Fig. 10, in which case only the swing-back is used, we notice that the picture plane is at the base of the plate, and in this condition the image will be very indistinct and the top entirely missing. Now, should we employ the rising front (Fig. 11) the axial rays are brought nearer the center of the plate and much better definition obtained.

The proper manipulation of the swing-back and rising front of the camera is of vital importance to the architectural photographer, who is required to have perfect sharpness and rectilinear lines in his pictures, and it is in the judicious arrangement of these parts of the camera that he shows his skill.

The Horizontal Swing of the camera.

This adjunct is very seldom brought into play; its only use perhaps is to reduce the unduly



violent lines of perspective when taking a view along a one-sided structure on a narrow street.

We will now consider the most important instruments of the architectural photographer's equipment; his lenses, the best of which cannot be too good. The severe requirements of modern architecture demand a combination of four lenses: the rapid rectilinear, wide-angle, telephoto and extreme wide-angle. With these the photographer can solve the most intricate problems that may come within the scope of his work, and especially with the two last-named objectives he is able to undertake subjects which were heretofore beyond his reach.

The rapid rectilinear is the most pop-The Rapid ular of lenses, because of its all-round Rectilinear usefulness and moderate price. As its name implies, it should be rapid in action, possess a flat field and great power of definition, and, above all, reproduce straight lines with unerring fidelity. modern anastigmat is an example of the perfected rectilinear and eminently adapted for architectural work. A reproduction of a building with its lines out of perpendicular is worthless to the architect. Furthermore, if we notice the lines of classic work, we observe that the shaft of the columns gradually diminish at the top, giving the appearance of grace and strength to the edifice; and the ancient Greeks even went so far as to give a horizontal curve to the lines of their temples to aid the perspective. If these lines are disturbed the whole character of the design is lost.

Angle of Vision

The angle of vision giving the most pleasing effect is from 40° to 50°, requiring a lens with an equivalent focus of thirteen inches, or the distance from the center of the lens to the ground-glass of the camera should measure about thirteen inches on an 8 x 10 plate. It is important that the circle of illumination of the lens shall exceed the size of the plate it is intended to cover, and this it should be capable of doing with the largest diaphragm. If this condition does not exist and the camera is tilted, or the front-board raised, the corners of the plate beyond the circle of illumination will be unexposed and black in the finished picture.

Whilst the artist seeks a blurred image, the architect demands all the details necessary for the proper presentation of his design; and perhaps in no other branch of photography is a lens put to such a severe test to obtain this definition. The probable extreme elevation of the front-board, the strained position of the swing-back, a non-actinic object and a crowded thoroughfare, are conditions sufficient to test a lens to its uttermost capacity, and one which does not fulfil these requirements is not worthy of the photographer's attention. For these reasons the anastigmat, with its wonderful power of definition, is preëminently the lens for architectural work.

The next lens of importance is the The Widewide-angle lens, i.e., an objective with angle Lens focal length less than the base of the plate it is intended to cover. For ordinary use this focal length should not be less than one-half the base measurement of the plate, or, to be more precise, should not embrace more than an angle of 90°. The wide-angle lens is the cause of many failures in photography. should be employed only when strict necessity demands it. and then with careful judgment, as its tendency is to foreshorten perspectives, producing harsh vanishing lines, exaggerating the perspective and causing distortion of the image. But, as photography is strewn with limitations, this lens, when judiciously employed, relieves many a difficulty.

Another lens of great value to the architectural photographer is the telephoto lens. Although this instrument has not yet been employed to any extent in architectural photography, it may be truly said that in no other branch of photographic work does it find a more practical application. It has opened a new field to the photographer, and details such as caps of columns, entablatures, cornices and other inaccessible parts of buildings, are now within his reach, and can be rendered with a correctness of perspective heretofore impossible. More than this: the details of ornaments which were usually blurred and indistinct are now produced with the clearness and sharpness of the most carefully focused microscopic photographs.

Briefly described, a telephoto lens is an ordinary rectilinear to which has been added an attachment containing a negative lens. The attachment usually consists of a lens-tube threaded at one end to screw into the ordinary lens, the other end in which the negative lens is placed being fitted into the front-board flange of the camera. The attachment is also fitted with rackand-pinion movement for convenience in getting the different magnifications as marked by the optician on

the tube.

It is unnecessary to dwell on the subject of telephotography here, as this has already been treated in a



Long-distance Detail Work Henry C. Delery



Monumental Work Henry C. Delery

previous issue, THE PHOTO-MINIATURE No. 26, a careful reading of which, with No. 1: Modern Lenses and No. 36: Lens Facts and Helps, will be of great assistance to the reader who desires to be informed in

his choice of a proper objective.

With the invention of the telephoto Extremelens, a step forward was made in the angle Lens manufacture of photographic objectives, and the wonderful results obtained with these lenses led some to believe that perfection had been reached. with the introduction of the American style of "skyscraper" architecture, the photographer was nonplussed as to how edifices of such tremendous height could be successfully photographed. The optician, however, was equal to the occasion, and with consummate skill produced that remarkable objective, the Goerz Hypergon Double Anastigmat, having an extreme angle of 135°, with astigmatism, spherical aberration and curvature of field completely corrected over the entire surface of the field of view and consequently giving a clear and sharply defined image to the very edges of the plate.

The performances of this lens can be justly appreciated when we consider that heretofore an ordinary wide-angle lens of 6 inches focal length could only produce a picture 10 x 12 inches, whilst the Hypergon of 6-inch focus will work out a plate 20 x 24 inches. It should be noted that in this lens chromatic aberration is not corrected, but is eliminated after the image is focused by the use of the smaller diaphragm opening. If the exposure is made with the large stop, it will be necessary to move the ground-glass forward one-fiftieth of

the focal length nearer to the lens.

The Star-diaphragm argins of the plate, and this becomes more pronounced with the increased angle of the image. To counteract this defect, an ingenious contrivance in the shape of a rotating star-diaphragm has been devised for the Hypergon. This is curved and shaped to fit very close to the surface of the lens and shields the center of the plate from light, so that the light is fairly equalized over the whole of the plate. Of course, if

the star remained at rest during exposure, a blurred image would be produced, as may readily be seen by looking at the ground-glass. It is therefore necessary that the diaphragm should rotate and, as the center of the plate must also be exposed, it must be removed altogether during the latter part of the exposure. This is provided for so that, by touching a spring, the star is released from its position and gives a clear field to the lens during the exposure.

Exposure with the Hypergon Under ordinary conditions, on a fairly illuminated object, the proportion of exposure with the star-diaphragm to that of the free lens, is as 6 or 8 to 1; in other words, say 6 seconds' exposure with the star to 1 second with the free lens. For interior work, where the exposure is much prolonged, it is not necessary to maintain the star in permanent rotation, and only requires to be moved at regular intervals by pressure of the exposure bulb.

The Sliding Shutter

The manufacturers of the Hypergon have lately introduced a sliding shutter, so shaped as to render the exposure a slide cut in the shape of two isosceles triangles, the bases of which are perpendicular and the apex pointing to each other at the center, but separated by about an inch or two. The exposure is made by simply pushing the slide from one end of the shutter to the other.

Before parting with the subject of lenses, a word or two concerning the diaphragm will be appropriate. The functions of a diaphragm in a lens are numerous, the principal of which is to increase sharpness and definition in the picture and increase the depth of field covered by the lens. In order to meet the severe requirements of an architectural photograph, it is absolutely necessary to use a small diaphragm. Whilst this gives greater latitude for the exposure and reduces the chances of failure in this respect to a minimum, the duration of exposure is necessarily prolonged. This, however, is not of very great importance, as the architectural photographer is seldom required to make extremely short exposures.

Another effect of the diaphragm is to increase the

apparent contrast. A large diaphragm tends to produce a soft negative, comparatively free from contrasts, and a small one increases the depth of the shadows and gives sparkle and brilliancy to the picture.

Having mastered the principles which constitute correct perspective and the proper working of our apparatus, we will now endeavor to put our knowledge of these principles into practical application and begin actual operations in the field.

First comes the composition of the Composition picture. So much has already been written on the proper position to be taken as regards the object when treating of perspective, that it only remains to add a few words in regard to the accessories or surroundings of our subject. Should the architect have done his work well and the landscape be in keeping with the subject, our task will be a pleasant one indeed. The environment of a building plays a most important part in the making of the photograph, and the key to success is to make the surroundings appear in harmony with the subject. We will first consider the commercial building.

Here, to give the picture a proper Commercial tone, a scene of animation should be Buildings presented, such as people walking along the sidewalks, cars and wagons in the streets, and even in the building itself a person or two should occasionally appear at the windows. If there be a flagpole or smoke-stack, the flag should be flying from the former and smoke issuing forth from the latter. These may appear superfluous trifles, but they add a great deal to the interest of the picture.

What is said in the preceding para-Public graph would also well apply for stately Buildings edifices, such as public buildings, churches, etc., which are generally made to appear in photographs as if the premises had long ago been vacated, and we are apt to scrutinize the picture for the

customary "To let "sign.

It sometimes happens when photographing a building on a crowded thoroughfare that the subject is of a nonactinic color and renders an instantaneous exposure an impossibility. By using a small stop and a long exposure, there need be but little fear that moving objects will show in the picture, provided, however, that these continue moving and that they are not of a brighter color than the building. In this event it is best to cap the lens temporarily and then continue the exposure after such objects have passed by.

Pictures of dwellings should also suggest the presence of life. Harmony and order must be observed and all objectionable features weeded out. The building itself must be the main feature and predominate over all accessories, such as trees, hedges, fences, walks, etc., which must be subdued and made to help the general composition to form a harmonious whole. In the building itself the doors, blinds, shades of windows, awnings, etc., must be arranged to help the general effect, and a few persons appearing on the scene will greatly enliven the picture; but we must enter our protest against the conventional grouping of figures, which so often spoils an

otherwise good picture.

The sky of the architectural photo-The Sky graph must also be given careful thought. The designer often attaches great importance to the sky-lines of his buildings, and it is our duty to see that these are well set out. The best sky, of course, is one which has clouds, but as these are not always present when the picture is taken, resort must be had to printing them in from another negative specially made for the purpose. We will treat of this later. But by all means a dark and muddy sky should not be tolerated; such a sky may sometimes be blocked out with opaque, but this treatment requires considerable skill and patience to be properly done. If this process is resorted to, it is desirable that the sky in the print should be flashed, that is, the print exposed to the light just enough to slightly tint it, but not sufficiently to injure the high lights in the picture. A broad expanse of blank paper crowning the picture is execrable and not compatible with good taste. If the sky is flashed, the tint should be gradated from faint gray to almost white at the horizon.

The second consideration in the com-Light position of our picture is the lighting. and Shade Bodies may be divided into two classes: luminous bodies, which give out light, such as the sun; and opaque bodies, which intercept the light, as wood, Light emanating from a luminous object and falling upon an opaque body is received by that part of the body which is toward the source of light. That portion of the object upon which the light falls is called the illuminated part of the body, and the portion from which the light is excluded is designated as the shade of the body, and the line which separates the illuminated part from the shade is called the line of shade.

If an object be placed in close proximity to a body and between the body and the source of light, it is evident that the first object will obstruct the rays of light from falling upon the second body. The part of the surface from which the light is excluded is called the shadow of the object, and the boundary of this shadow the line of shadow. We then perceive that we have two factors to deal with, -shades and shad-Shade differs from shadow, as it implies no parparticular form or definite limit, whereas shadows represent in form the object which intercept the light. One side of a house may be in total shadow, yet the shade imparts no idea of its form or dimensions, but the cornice of the same house may cast a shadow on its lighted side and immediately gives some idea of its size and Herein lies the great importance of shadows to the architectural photographer. The designer not only draws his molding, projections and ornaments with an eye to good projections, but also keeps in mind the amount of light and shade which will fall on his building and give character to his work. Delicate tracery or leafy ornaments cast light shadows, while a lintel or column gives a dark, bold impression, the one suggesting decoration without the necessity of strength, the other power, force and resistance. It will also be noticed that the shadows are almost always darker than the shades of the adjoining body upon which the light is cast, the former receiving the direct rays of the sun, the latter

being partly brightened by reflected light. Further, if we contemplate an extensive area, we note that the nearer the objects are to us, the more brilliant are the high lights and the deeper the shadows; these gradually diminish as they recede, until they assume an even gray-

ish blue tint in the far distance.

Putting these axioms into practical application, it is safe to conclude that the portion of the structure which is in the shade will be secondary to that which receives the direct rays of the sun, and this furnishes the photographer with an admirable opportunity to bring into prominence the front, which most requires it, and to subdue the other. It is very poor taste to have both sides of the building brilliantly lighted, as this offers no relief, but creates a painful monotony in the picture. By far the best results are obtained when the sun casts a shadow at an angle of 45° on the front or most important facade, leaving the supplementary side of the building in the shade. The morning and evening hours, therefore, afford the most favorable opportunities for good work. A photograph should never be attempted at noontime, when the sun is at its zenith, the resultant shadows at this time being long and unnatural.

The photographer should strive to enter into the spirit of his work and modulate his light to obtain delicacy and boldness according to the demands of the subject treated, bearing in mind that dark shadows tend to give strength to the work. These shadows, however, should never be so dark that the minutest detail cannot be seen through them. He should give as much attention and study to the lighting as the artist would in his studio, and it would well repay him to notice the time of day when the structure appears at its best and expose his plate accordingly, remembering that whilst the artist can modulate his light at will, the photographer must accept the light as it comes, using his judgment and skill to secure the best results. some part of the building appear bare and uninteresting, as a blank wall brilliantly illuminated, it will be well to introduce some object to break the monotony and give some relief. Generally this can be accomplished by the simple means of light and shade.

The photographer is put to the severest test in the photographing of in-Interiors The slightest error in compoteriors. sition here is greatly magnified, the most contradicting lighting has to be overcome and the technical operation of focusing and timing the exposure are such as to re-

quire the best efforts of the expert.

The two primary causes of failure in interior work are bad perspective and faulty lighting; and the defects of the first can be chiefly attributed to the too frequent and unintelligent use of the wide-angle lens. It is well to remember that the human eye can observe with clearness only a small angle of space, and the nearer the angle of view in the picture approaches the normal angle of vision, the better and more pleasing the results will be.

In selecting a point of sight, it is best Point of Sight to take a position which will embrace at least two sides of a room. If three sides of a room be included, as in photographing a hall, the camera should be placed a little to one side, so as to prevent the appearance of a one-point perspective in which the vanishing lines are directed to the center of the picture, and the farthest wall having its horizontal lines parallel, an effect which is very crude and displeasing.

When photographing small interiors in residences, a point of sight may be taken slightly lower than for exterior work, otherwise a too sudden rise in the floor, with a complementary effect in the ceiling, may cause distortion in the picture, and if a single wall is shown the lines should run to an imaginary vanishing point to

prevent parallel vanishing lines.

Regarding the composition of interior Composition scenes, simplicity of arrangement and harmony must chiefly be striven for. The picture should have one point of interest, and particular attention must be paid to the foreground. It should be remembered that, according to the true laws of perspective, all objects placed in the immediate foreground appear greatly magnified, and whilst this is absolutely correct, the effect is very unpleasing; hence.

the importance of a practically clear foreground, or one

relieved only by small, unobtrusive objects.

Care must be taken not to crowd too much into the view, and the accessories should be arranged so as to suggest a sense of life,—as, for instance, an open pianocase with the sheet of music on the rack, a few books placed on the library table, a fan or handkerchief carelessly left on some piece of furniture; and, whilst an unconventional and artistic grouping is desired, disorder and untidiness must not be tolerated, which would rob the picture of its principal charm.

The problem of lighting interiors is complex. The greatest difficulty is to overcome the contradicting lights and shades which enter the apartments from different

sources, creating a confusion of shadows.

It will be well here to follow the same principles which guided us for exterior work, and endeavor to so concentrate our light that it will seem to come from one point. This is sometimes a very difficult task, but can be accomplished by the skilful arrangement of reflectors and the principal light, so as to illumine the objects which we desire to bring into prominence.

Reflectors bleached cotton or muslin, tacked to a frame, and can also be used to subdue the intense harsh light of the sun when it falls directly

into apartments on some undesirable place.

A picture should, if possible, never be taken with the camera pointed directly against the light, as the shadows coming in one's direction are usually bad. It may sometimes be necessary to exclude the light entirely from some openings. This is accomplished by either lowering the shades, closing the blinds, or, if need be, tacking some dark substance on the exterior. If a view is desired through the window, combining an exterior with an interior view, this can be obtained by first making the exposure for the interior with the opening closed, after which it is opened and another exposure of shorter duration is given for the landscape. Another method is to first take the interior by flashlight and then make a second time exposure for the exterior.



Public Work - A Municipal Building Henry C. Delery



Semi-public Work - Church Architecture Henry C. Delery

It is needless to mention that the direction of the flash should be from the point from which the light seems to appear in the picture, that is, from the openings.

We may be asked to photograph suites of rooms connected together with large openings or portieres; a view may be taken from a parlor looking through a hall into a library beyond. It may be that the first two rooms are badly lighted and dark, whilst the third, or last, is brilliantly illuminated. If an exposure is made under these circumstances it is evident that the farthest agartment will receive an undue proportion of exposure. The way to proceed in this instance is to close or mask the opening of the last room with a black screen, which is removed in time to give the room its proper proportion of exposure. The screen must be absolutely black and placed at the farthest side of the opening. Should the opening permit of being closed with doors, however dark these may be, they should not be used, for there will always be some molding, etc., which will reflect the light and result in disturbing effects in the picture.

To obtain a good focus in an interior

Focusing is often a very difficult task. An easy way is to first admit all the light possible into the apartments and carefully focus the image. Note the field of view, having first attended to the artistic arrangement of the furniture, and then manipulate the lighting to get the best effect.

There are certain interiors where the light of day does not penetrate, and Flash-lights these can be photographed only by means of flash-light; but this method is recommended only when all other means have been exhausted, as the general effect of flash-lights is to give harsh shadows, which are rarely, if ever, pleasing. A storage lamp is perhaps the best medium to employ for this purpose, as this instrument permits the operator to give a continuous flash which can be repeated at will. The flash is, of course, regulated by the size of the room. halls, etc., a bright reflector directing the light to the darkest corners will be of material help. To nullify the dark shadows usually obtained by a single flash, the lamp should be moved both vertically and horizontally during the flash, being careful to give the greatest flash from one point. This latter will give the main shadow sought for and the former will tend to lighten the otherwise impenetrable darkness. THE PHOTO-MINIATURE No. 30 deals very clearly with the use of flash-lights in

interior photography.

Yet one more word regarding the lighting of interiors. It must not be imagined that a strong sunlit day is essential to success, for sometimes the best effects are obtained when the rays of the sun are obscured by clouds. This applies especially to those interiors which are lighted principally through glass sky-lights, where it is inconvenient if not impossible to intercept the rays of the sun. Such pictures are perfectly well rendered if the exposure is made even during a rain-storm, the light being softer and more uniform.

Whilst a picture showing a building in its entirety is absolutely necessary to form an idea of the general proportion of the work, yet for the practical use of an architect these will not suffice. It is an established fact that architects are great plagiarists, as is evidenced by the architecture of the ancient Greeks and Romans, whose admirable proportions have been copied to this day. To obtain a clear conception of the details and ornamentation which are embodied in some designs, it is imperative that these buildings be photographed in sections upon a larger scale, showing all the necessary details clearly and distinctly.

Here again we must insist upon a true perspective. The details of buildings should be represented as if they were a part of a building photographed on a large scale. In other words, the lines of the detail photograph should bear the same relation to the lines of the building as they appear in the small picture, and that part of the building which is detailed should appear as if it was a part of the small photograph which has been

enlarged in the enlarging camera.

The principal cause of faulty perspective in detail work is the employment of a short-focus lens. A building which has been photographed with a ten-inch focus lens should be detailed with one of at least thirteen to sixteen inches; for if the same lens which was used to photograph the entire building is employed to reproduce the detail (oftentimes an enlargement of ten times the original size), it is evident that the lines of perspective will be strained, the vanishing lines abrupt and distorted. Of course, in some instances the detail will appear well when photographed with a short-focus lens, i. e., when there is no obtrusive background; but there is always some danger here that if the detail itself is in good perspective the confusing directions of the lines of the background may mar the pleasing effect of the pic-

When photographing outdoors and making details of objects at high altitudes, such as cornices, caps of columns, etc., the telephoto lens will be of great help. With these objectives many defects of perspective can be remedied and objects heretofore inaccessible are brought within the field.

Regarding interior details, it is best Interior not to include too much in the view,-Details just enough to properly set out the picture. If a mantel is photographed, a small portion of the ceiling and floor should be visible and the stationpoint taken from one side of the mantel to show the returns of the projections and moldings. A stair should be photographed from the side and obliquely, never directly from the front.

There is yet one other branch of architectural photography in which the Monuments photographer has ample opportunity to display his ability; viz., the reproducing of monuments, statuary, and the like. As in this class of work one is not very much restricted as to space, a long-focus lens should be used, and a point of sight obtained at a sufficient height to give pleasing perspective.

For statuary or small monuments, a point of sight at an ordinary distance will suffice; for statues on high pedestals the camera should be placed at a remote distance from the object. The surroundings should receive special notice, even more so than with the usual architectural subject, and everything that can excite interest in the picture brought into view. The background in particular must be suited to the subject; e. g., white statuary, when photographed in the open air, should never have a clear sky as a background, while, on the other hand, bronzes and dark subjects require a background which has a brighter hue. In fine, to properly photograph monuments and statuary we must give the subject all the care and study which the portrait photographer be-

stows on his sitter.

Experience shows that for this character of work the best results are obtained in cloudy weather, when the rays of the sun are partly obscured, or even in the shade. By making the exposure in subdued sunlight, not only is the modeling and rounding of the subject rendered better, but greater softness and delicacy of detail are secured. If the subject be a piece of statuary, and we attempt to photograph it under the unobstructed rays of the sun, the shadows cast under the eyes, nose and chin will be very harsh and the delicate modeling of the picture will be lacking.

Commercial Photography Protection And now we must part with the semipictorial side of our subject, for the commercial side. By this we under-

stand the reproducing of structural details of buildings, and such other work as may be required for the actual execution of the building itself. A building may have to be altered or repaired, and a photograph demanded to show the exact existing conditions. In a case of this character it is best to reproduce the building on a scale, in order that the draftsman may be able to obtain his proportions and dimensions to lay out his drawing.

A position is taken directly in front of the building and as far removed as is possible, in order to reduce the perspective to a minimum. A batten, say about two inches wide and ten feet long, having each foot-space marked in plain figures, is set on the wall of the building. This will serve as a future guide to the draftsman when scaling the photograph, and will also be the means by which the photographer will establish his scale when focusing the picture. The camera is set up, and, by applying a draftsman's scale on the ground-glass, after shifting the camera to its proper position, dimensions corresponding to those marked on the building will be

obtained on the scale. In other words, if the footmarks on the batten measure one-eighth of an inch on the ground-glass of the camera, the photograph will then be on a scale of one-eighth inch to the foot.

This method is also commendable when photographing manufacturers' details, such as panels, ornaments, moldings, caps of columns, etc., which are sent out as samples. The principal feature in this class of work is to avoid all perspective, in order that the photographs

may be scaled accurately.

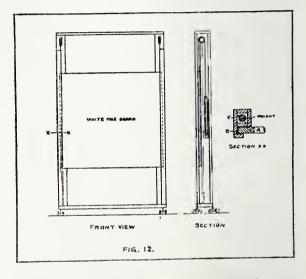
Still another important task for the Records of architectural photographer is making a Building Construction record of an edifice as its construction progresses. In this instance a truthful representation of the building is absolute, and still further steps must be taken to verify the truthfulness of the reproduction, as photographs of this nature may be used to settle contentions in the courts.

If the photographer is required to follow the history of the building from its conception to its completion, the first step should be to photograph the condition of the adjoining buildings, which, from various causes, may be in bad condition, such as cracked or decayed masonry, walls out of perpendicular, and the like, and which, if not photographed previous to the demolishing of the building, may involve the owner or the architect in serious trouble. For a wall which is out of perpendicular, the camera is set up with its swing-back absolutely plumb; on the building itself a plumb-line is dropped from the top of the wall and held free against the batten with foot dimensions marked on it; in this manner the distance from which the wall is out of perpendicular is plainly visible and cannot be disputed. It is also well for the photographer to have his note-book at hand, and record all data which may be of importance.

When the time of erection begins, a weekly photograph should be taken of the premises and, if the building be a time contract, the date should be plainly marked on a sign which is included in the view. This will save considerable contention at a later date and make the photograph convincing in itself. For a high structure, it is well to mark the number of the floor on the date sign. When the structure is finally completed, the architect has a record of his building which may be of inestimable value for future reference.

Copying
Architectural drawings may have to be copied, and here the architectural photographer enters a new field. Perfect accuracy must again mark his work.

We will first study the drawings. These are often made



on rough surface paper, and it is desirable when setting them up that the light should strike the paper from all directions, thereby doing away with shadows, and, to a great extent, preventing the rough grain of the paper from showing. As the designs and plans prepared by architects are drawn to a scale, it is well when reproducing them to see that the scale-unit is preserved, and, if possible, to reduce to some convenient scale generally employed by architects. If there be no scale marked on the plans a line should be drawn with inch- and footmarks figured upon it, so that the draftsman can, if

necessary, decipher the drawings.

To facilitate matters in copying plans, we would suggest an installation, as shown in Fig. 12; this consists of a wooden frame, the uprights of which are provided with grooves, B, in which the board A slides, and with pocket, C, to receive the weights, which counterbalance that of the board, and allow it to remain stationary at any elevation. An ordinary sash pulley set in uprights of frame and near the top permits the cord which connects the board and weights to move without friction. The frame is well braced at the bottom and made rigid and provided with a set of castors. The board should be of some soft wood, say white pine, to permit the thumb-tacks with which the drawings are fastened to be easily put in and extracted.

To obtain the best results, the drawing is tacked to the board, the surface of which must be parallel to the ground-glass and at right angles to the axis of the lens, and in such a manner that the axis of the lens strikes the drawing in the center, thereby doing away with the necessity of tilting the camera or using the rising front or swing-back, and ensuring straight lines in the photograph. By the employment of this frame, the camera once set up need never be disturbed, everthing except the actual focusing of the picture being regulated by

the adjustment of the board.

For general outdoor work on commercial buildings I have found the ordinary unorthochromatic plate quite capable of giving good results, and for this work would recommend a fast plate which will enable us to photograph even non-actinic buildings instantaneously on crowded thoroughfares. Naturally the latitude in exposure is greatly reduced, but one soon accustoms himself to the speed of his plate, so that exposure soon becomes of secondary importance. Another advantage of the fast plate is that it permits of the use of a very small diaphragm, -an item of considerable importance in architectural work, where a great amount of detail and clearness is always required.

Orthochromatic Plates

Grand tone effects are desired, the orthochromatic plate is advised. The principal benefit derived from its use, besides the true rendering of color luminosities, is a more brilliant negative with better detail and a clearer rendering of distance. For monuments and similar views, where the natural scenery or a sky silhouetted with clouds is intended to embellish the picture, an orthochromatic plate is indispensable.

It would be trespassing beyond the limits of this little sketch to enter into a detailed description of the orthochromatic methods. This has already been done in previous issues of THE PHOTO-MINIATURE, Nos. 6 and 45. For the benefit of the reader who may not have these at hand, however, a few words of explana-

tion may be acceptable.

The theory and practice of orthochro-Theory of Orthochromatic rized as follows: The different rays of Methods the spectrum act upon the ordinary bromide of silver plate with unequal intensity, the blues and violets being more energetic than the reds and yellow and green rays. Although these latter appear brighter to the eye, they reproduce dark in the print, creating an unnatural representation of the different color values. In order to equalize the effect of light upon the plate, dyes are introduced into the films which depress the over-active rays and give more scope to the less active colors. The plate consequently loses some of its rapidity, but, on the other hand, a more even distribution of light action is obtained. The sky, which usually is over-exposed in relation to the foreground, is subdued and held back until the other portions of the scene have impressioned the plate, thereby producing a more equally illuminated picture. Orthochromatic plates are prepared

Preparation by two methods,—first by bathing the ordinary plate in certain dyes, and in the other by incorporating the dye in the emulsion. This is the most popular process, having the property of preserving the plate free from deterioration. It is more

reliable and certain in its results, and, withal, few photographers care to trouble themselves to color-sensitize

their own plates.

While orthochromatic plates will undoubtedly do much to equalize the varying intensity of different colors, this defect has not been entirely corrected, and, to achieve the most perfect results, color-screens must be employed. The commercial orthochromatic plate, though very sensitive to green, red and yellow, still retains a too active tendency for the blue, violet and ultra-violet rays. In pictures where these colors predominate it is necessary to employ the yellow screen. This screen retards the too active blue and violet rays and gives more scope to the red, green and yellow. Screens of different intensity can be employed to suit the color of the subject, but, for dimly lighted interiors and somber places, it is undesirable to use one that is too dark, as with such a screen the exposure is very much prolonged.

Orthochromatic plates are also very desirable for copying water-color drawings and sketches; but for copying-line drawings and pen-and-ink work, a slow plate rich in silver is the one to employ. The requirements of such a negative are clear lines on a dense ground, and this is attainable only with a slow plate. The prolongation of exposure in this instance is of minor importance, as the subject is always sure to be

absolutely free from vibration.

The final item to guard against in a plate chosen for our purpose is halation. Halation Halation, as we all know, is caused by the light passing through the film and striking the back of the glass plate, which, acting as a mirror, reflects this light back to the film, thereby causing a spreading of To remedy this defect several methods are the image. employed, the most reliable and simplest of which is the use of double-coated plates. These plates are first flowed with a slow emulsion, and when dry given a second coat of a more sensitive film. When photographing an object with great contrast of light, the brightest rays which penetrate through the outer or more sensitive emulsion are arrested by the slower emulsion underneath before they can reach the glass surface of the plate. The dark rays are imprinted on the rapid emulsion; in fact, all the lights, from the brightest to the dullest, are retained within the range of the two films, with the result that the high lights are subdued and the shadows remain uninjured, giving brilliancy and the most delicate gradation in the lights as well as in the shadows. It is especially for interior work that these plates can be appreciated.

A word may be said concerning the Size of Plates size of plates. The admirable propor-

tions of the 8 x 10 plate are most suitable for architectural work. Precedent has established this as beyond doubt the most popular size; next comes the 5 x 7 of about the same proportions though smaller. The sizes above 8 x 10, unless for some special purpose, are unwieldy and are seldom employed.

For the tourist, rollable films on the cartridge system are a great convenience, on account of their light weight, com-

pactness and the facility with which a great number of exposures can be made without having recourse to a dark-room, a convenience not always to be found whilst traveling. Their employment, however, is recommended only in conjunction with a camera fitted with a roll-holder attachment, which permits the picture being focused on the ground-glass; otherwise their usefulness for serious work is very limited.

Concerning development very little
Development need be said, as all photographers have
a preference for some of the many reducing agents, and from practical experience we find
that to be successful it is best to adopt one formula
and employ it at all times when conditions permit, in
order to familiarize ourselves with its peculiarities

and modifications.

The ideal negative for an architectural subject is one rich in detail, brilliant yet soft and well modeled, vigorous, but free from harsh contrasts. The most desirable developing agent for this class of work is our old and well-tried friend, pyrogallic acid; at least this is my opinion. Pyro may be likened to the architecture of the

ancient Greeks and Romans, which has stood the test of time and evolution, and is still the standard of design.

Fixing Bath Solution made up of six ounces of hypo to twenty-four ounces of water, to which

has been added one to one and one-half ounces of a saturated solution of chrome alum, is all that is necessary. Chrome alum is better than white ammonia alum, which often eats into the film and ruins the negative.

One bit of advice may be given the traveling architect. A plate or two should be developed occasionally to ascertain whether the exposure and other conditions which are essential for the making of a good negative are approximately correct. The constant changes of base, with the different intensities of light, are very misleading and sometimes the cause of very vexatious failures.

Another hint would be to make a record of each plate, when exposed, taking the number of each holder, etc., and when the day's work is over and plates are being changed, to affix a little label such as are used as thumb-labels on lantern-slides, and mark the number of the respective exposures to correspond with the record. On the return home, if one desires to develop some particular plate, there will be no trouble experienced in finding it, and should any errors have occurred in timing the exposure, the plate can be developed more intelligently and many failures prevented.

Printing Processes

And now our monograph nears its end. All that remains is to inquire into the means of obtaining prints, and our task will be done. At the present day, the selection of a suitable paper is largely a matter of taste or fitness for the purpose in view. There are three processes, each different in their manipulation and results obtained, yet each of which is productive of good effects. I refer to the platinotype papers, those which require toning, such as Aristo and Solio, and development papers of the Velox, Vinco and Cyko class.

For the highest quality and most per-Platinotype manent work, where expense is not a serious consideration, I would emphatically recommend platinotype. Its range of tones from the deepest black to sepia, reds, browns and blues, to say nothing of the color combination obtained with it and the ease with which it is manipulated, places it above all others. It is surprising that photographers do not more generally employ this process in this most important branch of photography. Its permanence alone should render it invaluable.

Printingout Papers

These print-out papers require considerable time, both in printing and after-treatment in the toning bath, in spite of which they are still the most popular of all papers, perhaps on account of their adaptability to all sorts of negatives and subjects.

Development Papers The development papers, of which there are now quite a number, are a great help when time is precious, and the results are exceedingly good, some bearing a close resemblance to good carbon prints. With these papers sunlight is entirely dispensed with and dull, cloudy winter days have no more terrors. THE PHOTO-MINIATURE No. 46 tells of their manipulation in detail and how to choose among them.

Whilst on the subject of printing, it might be well to call attention to the

blue-print process. This process is extensively employed by architects in making copies of their plans from tracings. The bulk of the work, however, is often done by dealers in mathematical instruments, who reap a very lucrative profit from it. I have often wondered why the architectural photographer does not cater to this trade. The process is so simple that it can safely be entrusted to a boy of ordinary intelligence.

A negative as it comes from the fixing bath is rarely if ever perfect, and it rests with the printer to overcome all those little defects which impair so much the beauty of a print. Here much can be accomplished both for good and evil. We will first take a photograph of a building which depends on the sky-lines to properly set it off.

Perhaps no clouds were present when the exposure was made, or, if they were there, it was impossible to retain printing density whilst developing. If printed in this manner, the sky will either be dark and muddy or else a perfect blank; in both instances the picture will be crude and inartistic; a dark sky will surely ruin the effect, whilst a clear "chalky" sky could be flashed as previously remarked and rendered passable. To obtain the best effect, resort must be had to printing in a fictitious sky from a cloud-negative made specially with this object in view.

There are several methods of printing Printing in clouds into the picture, the following Clouds being perhaps the simplest, safest and The outline of the picture is roughly traced on tissue paper, which is applied to a piece of opaque paper and the outline cut through; the portion above the cut will serve as a mask to protect the sky when printing the landscape section of the negative, and the bottom part will answer the same purpose for the landscape when printing the clouds. The clouds should be printed first. The picture-negative is placed in the printingframe and the height of the landscape part marked on each side of the frame; the negative is then removed and the cloud-negative put in its place with the sensitive paper. The mask for the bottom part of the negative is then placed so that the edges of the part which was cut will just touch the marks on the printing frame. The frame is then exposed to sun or artificial light, according to the variety of paper used, and the exposure made by constantly moving the mask with a slight Totary motion. It is best to allow the clouds to print a trifle below the picture line, so that no demarcation will show where they join the landscape, and also to be careful not to make them too dark. The same process is repeated when printing the lower or landscape part of the negative.

If a white monument or building is to be printed with a background of dark clouds, it will be necessary first to cut an outline or silhouette of the object and place this over the paper when printing the clouds, and at exactly the position which the monument will occupy

in the picture, thereby masking off the clouds at this particular place. If this is not done, the dark masses of the clouds will easily print through and appear in front

of the object.

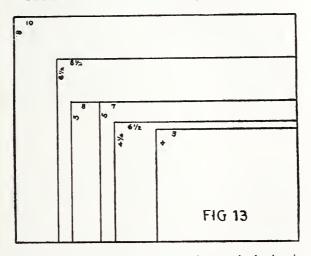
Another very simple method of improving a sky. provided the negative is thin, is to blend it, starting with the darkest part at the horizon and allowing it to gradually become clearer until the apex of the picture is reached. For this purpose a mask cut to conform to the top outline of the picture is held over the sky of the negative and gradually moved from the horizon line up. retarding the motion as the top of the picture is approached.

Some views, in which the natural scenery forms a good background, will appear nicely when vignetted. and others will be made more attractive by a small white border being left around the edges, or sometimes a black border. But we must strenuously condemn the numerical marking of the negatives as practiced by some photographers, who, through a lack of appreciation for their work, brand their pictures in a conspicuous place, likening them to a commercial article with no other merit than the price they will command.

When trimming prints preparatory to mounting, special care must be taken Trimming that they are perfectly squared. horizon line may be used as a guide, and all irregularities which may have occurred in the taking of the picture must be corrected. Regarding the means of trimming, we would suggest a small device of our own invention, which possesses many advantages over the manufactured glass forms. It consists of an ordinary glass form, on which have been etched lines marking the different sizes of prints. As illustrated in Fig. 13, the glass form, or a piece of plate glass with the sides accurately cut at right angles, is laid on a table, so that it will be perfectly level, and melted paraffine is poured over it until covered. When dry, lines marking the different sizes of plates are drawn on the surface, using a rule and hard pencil with a sharp point. Of course these lines must be absolutely square and true, and parallel with sides of glass form. When all the lines

are drawn, and the surface of the glass is cleaned of all surplus paraffine which may have accumulated, an etching fluid is poured on the plate to act upon all places not protected by the paraffine. The following will answer the purpose: Carbonate of ammonia, 14 parts: hydrofluoric acid, 16 parts; water, 4 parts.

This solution should be made up in a rubber bath



and care taken not to let the solution touch the hands or clothes.

When sufficiently etched the plate is washed in hot water, and all that remains to be done is to rub a little coloring matter over the lines to make them prominent. The claims made for this form are that it combines several glass forms into one and can be moved over the prints so one can see exactly at a glance what will remain of the picture when trimmed, and it is practically impossible to cut a print which will not be perfectly square.

After printing and trimming comes the mounting. The mount for a print Mounting can be likened to a magnificent edifice which requires but a few touches of color to give it tone and character. Unfortunately, if we examine the finished product of many professional photographers, we often see a beautiful print attached to a plain card usually gray, sometimes dark green or black, with no attempt at artistic effect, the mount being used simply as a vehicle to protect the print. Great improvements in mounting have been made in other branches of photography, and the architectural photographer had best take heed lest he be left completely behind the times.

To obtain the best effect, the mount should either harmonize with the ruling tone of the picture, or agreeably contrast with it along the lines of complement of colors. Harmony of tone should be sought for, and, though contrast of color is very pleasing, this should be kept within conservative lines. Double mounting, that is, to set the print upon a thin paper of different tint from the mount proper, offers opportunities for excel-

lent combinations of colors.

Now as to the method of mounting.

Plate Mark We will suggest a plate mark. If the
mount be a thick card it will be necessary to construct a die. This is quickly made as follows:

A thick card of the same size as the mount is marked off in the center, with the sized opening desired; this is carefully cut with a sharp knife; the center-piece will act as the punch and the outer portions will serve as the die. A piece of thick paper is pasted to the punch when set in this die and cut to conform to the size of the card. To obtain the plate mark, the mount is placed on the die, and the punch set over same. As all pieces are of the same size, the punch will exactly center over the die, but with the card between; it is then only necessary to place the whole in a letter-press and give a tight pressure, and the plate mark is finished.

For mounts made of stout tinted papers such as are extensively employed for portraits and general views, a cardboard form is made of the desired size and the paper placed over it, and the plate mark produced by rubbing along the edges of the board with a stout ivory

paper-cutter.

For a proper finish for this style of mounting an envelope or enclosure should be provided. This can be done by placing the mounted picture on a sheet of the paper used for the mount, or of a different shade. and allowing a small margin on three sides and the fourth made large enough so as to fold over the picture. The top and bottom ends are turned over and glued down, but in such a manner that the edges will be free: the mounted picture is then passed under these two flaps, where it is held securely in place. A sheet of Japanese tissue set over the print completes the mounting.

In plain commercial work, when the photographs are to be kept on file and used for reference, and it is desired that they occupy as small a space as possible, the employment of muslin-backed paper is advised. By allowing a good margin on one end or side of the picture, the photographs can be bound in book form, this being a very compact and convenient method of preserv-

ing them.

HENRY C. DELERY.

BOOKS

Architectural Photography. By G. A. T. Middleton. A collection of articles contributed to The Amateur Photographer at various times and relating chiefly to ecclesiastical work. [English.] 1898. 78 pages; illustrated. so cents.

Photographic Lenses. By Conrad Beck and Herbert Andrews. The chapter on lenses for architectural work is remarkably clear and comprehensive. [English.] 1903. 288 pages; profusely illustrated. Cloth. 75 cents.

Elementary Telephotography. By Ernest Marriage. The author has given special attention to the use of telephotography in architectural work, and his book is valuable to those desiring further information in this detail. [English.] 1901. 118 pages; fully illustrated. Cloth, \$1

Monographs generally related to architectural photography in THE PHOTO-MINIATURE series are Nos. 26, 30 and 41.

Potes

The possibilities of the hand-camera in the hands of an expert are cleverly shown in a bromide enlargement from a small negative by Mr. J. C. Hemment, which we were shown a few days ago at the New York office of Taylor, Taylor & Hobson, Ltd. The 16 x 20 print showed a group of three race-horses, running at full speed, the camera having been held at right angles to the line of motion and probably within ten or twelve In making the original 5 x 7 plate feet of the animals. the new Cooke portrait lens of thirteen inches focal length was employed, in order to obtain a large image. Although worked at the full aperture of the lens, f/4.5, the photograph shows every visible vein and muscle in the horses. It is needless to say that a focal plane shutter was used for the work.

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A new lens—the Heliar. For some time past European workers of reputation have been writing about the Heliar lens and its performance. This is a new anastigmat made by Voigtlaender & Son, of Brunswick, Germany. We are just informed by the Voigtlaender & Son Optical Company, of New York, that the Heliar will be ready for delivery in this country on January I.

The Heliar anastigmat has a working aperture of f/4.5 and is notable for its defining capacity, giving images of great sharpness and brilliancy. It consists of five glasses, two cemented interiors and two cemented posteriors, with a single glass placed between the interior and the posterior elements. The Heliar will be mounted in aluminum and supplied with an iris diaphragm, the four-inch lens having a focal length of seven inches, the 5×7 a focal length of nine inches, and so on. There are other anastigmats working in some sizes at f/4.5, but

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to the best of our information the Heliar is the only lens working at f/4.5 in all sizes. Owing to its large aperture, it is not possible to fit the Heliar to such cameras as the F. P. K., etc. The value of the Heliar will be appreciated mainly by those who work with a focal plane shutter, and in its larger sizes the lens may supersede the ordinary portrait lens as it will give full figures and heads at full aperture.

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There is usually little pleasure either in the making or the reading of catalogues of photographic supplies. A notable exception is General Catalogue No. 16, just received from H. A. Hyatt, St. Louis, Mo., as clever a piece of catalogue-making as we have seen. The book is a professional list, supplies for amateurs having been omitted. In its 192 pages, 71/2 x 101/2, Mr. Hyatt has condensed interesting descriptive matter and illustrations covering almost a thousand different professional specialties, from portrait lenses to passe-partout outfits. The variety of the choice in each department is remarkable. Thus, under print rollers, instead of the familiar squeegee roller, the catalogue presents no less than seven different forms of squeegees. This may serve as an example of the fullness and interest of the volume. We note with pleasure that Mr. Hyatt devotes a special section of his catalogue to photographic books, the list presented being carefully revised to date, and offering a practical summary of the best books at present obtainable, with particulars and prices. The catalogue can be obtained by sending ten cents to cover postage.

2

We have received from the Voigtlaender & Son Opt. Co., New York, a notably good example of group portraiture, consisting of President Roosevelt and his family, apparently taken outdoors at their summer home. The 10 x 12 negative was made by Pach Bros., of New York, with a Collinear lens, and is said by those competent to judge, to be the best of the many presidential family groups which have been taken of late years. We felicitate Messrs. Pach Bros. and Voigtlaender & Son upon the excellence of the photograph.

The Infallible Exposure Meter Company, 237b South 4th street, Brooklyn, N. Y., advise us that they have many complaints of letters to and from them not reaching their destination, and that several meters and sundries have undoubtedly been lost or stolen in the mails. We are asked to make known to our readers that the company is endeavoring to remedy these grievous troubles and hopes to have all complaints adjusted at an early date.

Colonel John A. Ockerson, chief of the Department of Liberal Arts of the Universal Exposition to be held in St. Louis in 1904, is in receipt of information from the British Royal Commission, indicating that the photographic exhibit from Great Britain will be the most elaborate and complete ever made by a foreign country at an exposition. Sir Benjamin Stone, M.P., has taken great interest in this exhibit, and, with a collection of photographs from the various amateur photographic associations of England, Scotland and Ireland, intends to outdo any and all nations who are represented at the World's Fair.

A communication received by Colonel Ockerson from the American representative in London is to the effect that the United States will have to be up and doing if

they hope to equal this exhibit.

Mr. A. J. Jarman, a practical photographic chemist in New York, sends us a specimen print on matt albumen paper, prepared by a formula recently published in Wilson's Magazine. Matt albumen prints were famous years ago, and there are signs of this paper being popular once more in European countries. The print Mr. Jarman sends is very desirable in its quality, and we shall watch the development of the process with considerable interest.

Another paper which Mr. Jarman is experimenting with is one intended for making the professional photographer's proofs. The special virtue of this paper, which gives pleasing prints, is that the proofs made upon it cannot be toned, and are useless if fixed.

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The literary contents include a critique on the principal British exhibitions, and on the non-exhibited works, by A. C. R. Carter; a continuation of the "Hints to Would-be Picture Makers," by H. Snowden Ward; an Analytical Criticism of four of his own works, by Frederick H. Evans; and articles on the French School, by Robert Demachy; the German School, by Fritz Loescher; the American School, by Osborne I. Yellott and by Carl E. Ackerman; the Australian Work, by A. J. Hill-Griffith, etc.

To those who have not been able to visit the exhibitions it is indispensable, as form-

ing the only effective substitute.

To all interested in Pictorial Photography it is a highly interesting and educative volume, enabling the student to compare the different "schools" and exhibitions. Perhaps the most useful of all its functions is the introduction of new work by unknown workers, and this has been done more largely in 1903 than in any former year.

To art lovers in general it appeals strongly as one of the most attractive art publications of the year. To look through it is to delight the eye: to study it is to receive an

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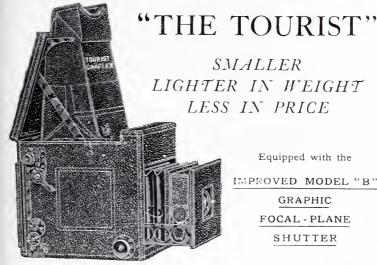
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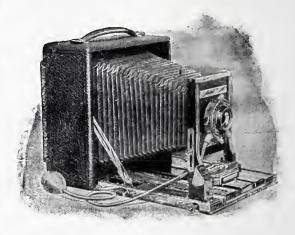
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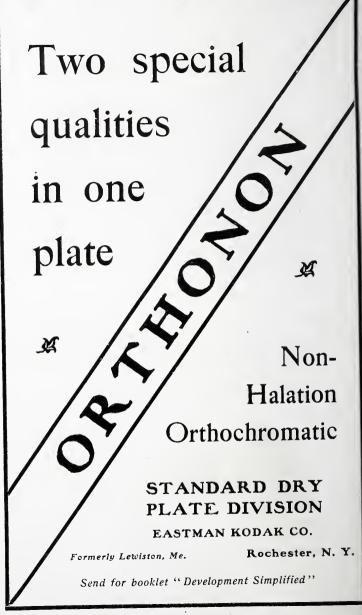
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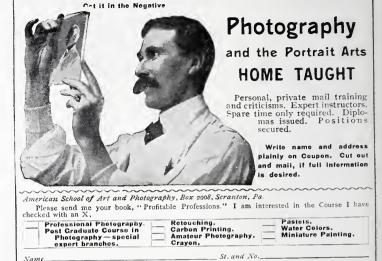
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OUTDOOR EXPOSURES



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287 FOURTH AVENUE, NEW YORK

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Vol. V. No. 54. September, 1903

To Mount a Print

To mount a print on an unsympathetic background is much as though one planted a seed in barren soil. Any print which is worth mounting is worth mounting well, and a little thought should always be taken to discover the most perfect harmony possible between the print and the mount; hence the collection of varied tints, ranging from the soft, delicate effects in Taffeta to the strong, virulent tones, oriental in their effect, of the Sultan, manufactured by Niagara Paper Mills, which (as Jasper says, "All the world knows") lies over against the Eighteen Mile Creek in the lower town of Lockport, New York. See our Sample Book. We direct you to our Agents on request.

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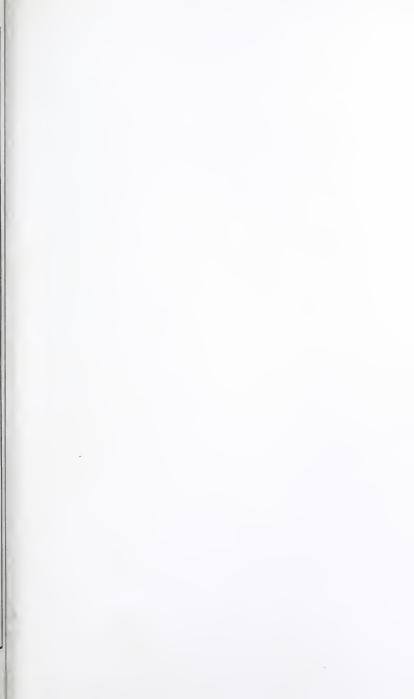
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A Magazine of Photographic Information EDITED BY JOHN A. TENNANT

Volume V

SEPTEMBER, 1903

Number 54

OUTDOOR EXPOSURES

Those who have watched the growth of THE PHOTO-MINIATURE series will readily understand that the publication of this little book on exposures out-of-doors is undertaken with more than ordinary pleasure. Viewed as a library of photographic information, the series, although more comprehensive than any similar work available for American and English readers, presents many gaps-spaces deliberately left unfilled because of the difficulty of obtaining information "fit to print" about certain subjects. The system of exposure here offered is designed by its author, Mr. Gaston M. Alves, to fill perhaps the most important of these blank spaces. It is needless to dilate upon the necessity of a thorough understanding of exposure in photography. We all realize its vital importance as the first of the two processes essential to the making of a negative. We are equally familiar with the very practical difficulties which are experienced in any attempt to arrive at a correct judgment in the matter. The innumerable tables and exposure systems devised during the past twenty years are eloquent of the intricacy of the problem, and their shortcomings are as obvious as their advantages. The intelligent photographer needs a system of which he may understand the principles as well as the practice and so be enabled to use his own judgment in place of the ready-made formula when this is inadequate to his necessities. I believe we have such a system in the following monograph. It is, in brief, the only one of many systems offered which appeals to my mind as worthy of a place in THE PHOTO-MINIATURE series. It gives, not only a practical working method, but also a clear explanation of the principles upon which the method is based. It has the further advantage of being universally applicable in all countries; all the reader has to do is to master the method of using the tables given, and then to take for his particular use the table calculated for his locality. Mr. Alves has wisely divided his monograph into two parts, in order to separate theory and practice. This will make the reading easier and a mastery of the system a simple exercise.—EDITOR.

It will be observed that this little How to Read work has a second part, but it is by no this Book means necessary that the general reader should attempt to master, or even to read it. He who seeks only a practical system of exposure will get all that he really requires in this first part, and can well afford to leave the second part to those who are of a critical turn, and who always demand a discussion of the principles upon which any practical system presented for their acceptance is based. Portions of the second part will doubtless be found rather difficult reading to some, but it is here promised that this firstthe practical—part, will be made so plain as to be easily understood and applied by any ordinary reader. If, indeed, the reader has been so indiscreet as to rummage through these pages, before reading them in their orderly succession, he has doubtless run across quite an array of tables, and may from this entertain the opinion that the task before him is tedious, if not difficult. Now, there could be no greater mistake than this. The tables involved considerable labor to the unfortunate who prepared them, but they will be no trouble at all to the man who is to use them. As a matter of fact. the latter will be concerned with only one of them, and in order that he may have no difficulty in finding it, he will be taken by the hand and led right up to the one he is to use. After he has looked into its application, he will find it just as easy as rolling off a log and much less riskv.

Now, after saying these amiable things to the gentle reader, I am forced by the inexorable necessities of the subject to do what may seem almost a thing committing us to an untruth. At the very start I must ask a few minutes' consideration of a dry subject. If there were any way in the world to avoid it we would certainly do so.

We must consider how time is measured; viz., the three kinds of time in use, namely: Solar Time, Local Mean Time and Standard Time. When we get over these dry things, all will be easy and pleasant. I am confident that the readers of THE PHOTO-MINIATURE will go through this little task acceptably; but if there are any timid ones who are afraid of hurting their gray matter, then let them simply slide over this to the easier things which follow.

By solar time the sun is always on the meridian—the north and south line—at exactly XII. It is the kind of time given by sun-dials, and was that in use before the advent of clocks and watches.

Local mean time is reckoned not from Local the actual sun, but from an imaginary Mean Time or mean sun. The actual sun does not reach the noon mark, i. e., the meridian, in exact periods of twenty-four hours, but in some seasons in a little less time, and at others in a little greater time. When watches and clocks came into use, it being impossible to regulate them to run by such varying differences, recourse was had to an imaginary or mean sun which would always reach the noon mark in exactly twentyfour hours. Thus, mean time means average time, and mean sun, an average sun. Now, as the mean sun is imaginary, it is of course impossible to see when it comes to the meridian-or in other words, when it is XII by mean time. But we can know it by this means: The astronomer computes for us the exact difference in time for each day of the year, when the real sun and the imaginary, or mean sun, reach the real meridian, and all we need to do is to note when the sun reaches the meridian, or noon mark, and then look into any common almanac, and, finding the "sun fast" or "sun slow" for that day, we apply this difference and thus get the exact time of the mean sun. Local mean time was that in universal use before the adoption of standard time. A very little consideration will show us that both solar and local mean time are the same for all localities on the same north and south line, it matters not how far extended. However, they both vary in an eastern and western direction at the rate of I hour for every 15 degrees of longitude, or 4 minutes for every single degree.

Standard time in the United States American agrees with local mean time, on the four Standard standard meridians west from Green-Time wich, respectively, 75°, 90°, 105° and 120°. Now, as these four standard meridians are 15 degrees, or I hour apart, and as each standard meridian fixes the time of all localities within 71/2 degrees on each side, it will be seen that standard time divides the whole of the United States into four great time areas or sections, each differing progressively by I hour. is to say, when it is XII in the eastern section, through which runs the 75th meridian, it is just XI in the middle section, through which runs the 90th meridian; just X in the mountain section, through which runs the 105th meridian, and just IX in the Pacific section, through which runs the 120th meridian. Obviously, if we want to set our watch, running by standard time, to the local mean time of any particular locality, all we have to do is to estimate, upon any map, the number of degrees the locality is from its standard meridian. The number of degrees so found, multiplied by 4, will give the number of minutes of difference between standard and local mean time. If the locality is east of its governing standard meridian, then the watch is to be set forward the number of minutes so found. If the locality is west of its governing meridian then the watch is to be set back the number of minutes. case, the watch will be set from its standard time to the local mean time of the particular locality.

Select from the seven tables given The Tables hereafter the particular one adapted to Herein your locality. This will not be difficult to do, as each of the tables gives its respective scope of



TRAIN RUNNING SIXTY MILES PER HOUR. Exposure, 1-8ooth second Copyright, 1903, by James H. McCorkle



A WEST VIRGINIA LUMBER MILL Needlehole photograph by Wm. R. Gardner

latitude, and, as stated therein, within that scope it applies to any longitude, that is to say, it is correct all around the earth in an eastern and western direction. In the United States in general, the proper table may be had by observing the list of states on the tables. But it will be best to consult a map, as your locality may be situated at such a point in your state that the next preceding or the next succeeding table would be better adapted for your use. Having selected from the seven tables that one proper to your locality, mark it, and let the other six be to you as though they had never been

orinted.

By looking at the head of your table, you will see that it is for the local mean time of your locality. If your watch goes by local mean time, then of course your watch and your table agree. But if you live in the United States, your locality in all probability goes by standard time. Again, if you do not care to photograph in the early and late portions of the day (that is, if you expose your plates only in hours represented by those columns in your table to the right of, let us say, the first three), then the variation between the standard time of your watch and the local mean time of your table will make no appreciable difference; hence you can go on without any corrections of time. If, however, you do care to make exposures in the early and late hours of the day, then you will need the use of the first columns of your table, and, in order to use them properly, you must expose, not by the standard time of your watch, but by the local mean time of your table; provided the difference between these two kinds of time in your locality is over five or six minutes. If the difference is not greater than this, then the matter may be neglected; but if it is greater, then you must provide for it. You might not think it, but such are the rapid changes of light at the time indicated by the first column of your table that ten minutes either earlier in the morning or later in the evening would usually call for about a 50 per cent greater exposure. It is true that if, in practice, we do not exceed this limit, we shall do very well, but it is always best to be as accurate as we can. If you do not know the difference between the standard and local mean time of your locality, you must find it as has been directed.

In order to familiarize all the foregoing, let us take some examples: In
these, directions are given to set a watch
forward or back, as the case may be, so as to bring
it to the local mean time of the tables. Of course this
need not actually be done, as the difference in time may
be carried in the mind. If, for instance, in a particular
locality, its local mean time is, say, 15 minutes faster
than its standard time, it will be easy to count the time
of the watch as 15 minutes ahead, without altering it.

A photographer in New York city wants to know which table he is to use. His watch runs by standard time; he also wants to know how he must set it so as to agree with his table. New York city is in the southeastern portion of the state; consequently, the lists of the states given on the tables show that he is to use Table III. An inspection of the map shows that the city is only about four minutes east of the 75th standard meridian. Hence, he may neglect this difference and go by the standard time of his watch.

The same for a photographer at Cincinnati. The table lists show Ohio to require Table III. The map shows that Cincinnati is about 22 minutes east of the 90th standard meridian. Consequently, he is to set his watch 22 minutes ahead.

The same for a reader at Chicago. The table lists show Illinois to require Table III. The map shows Chicago to be about 10 minutes east of the 90th standard meridian. Hence, he is to set his watch 10 minutes ahead.

The same for the reader at Savannah, Ga. The table lists show Georgia to require Table I. The map shows Savannah to be about 25 minutes west of the 75th standard meridian. Hence, he is to set his watch back 25 minutes.

The same for the photographer at Seattle, Wash. The map shows Seattle to come within Table IV. It also shows that city to be about 9 minutes west of the 120th

standard meridian. Hence, he is to set his watch back q minutes.

The same for the reader at London, Eng. The map shows London to come in Table VI, and, as London goes by local mean time, it conforms with the time of the table, no correction being necessary.

How to Use the Tables

Tequired, set his watch to the local mean time of his

table, proceeds to its use as follows:

Looking in the column of dates in his table, he finds his nearest date. From this he goes in a line to the right to the time nearest agreeing with the time given by his watch. Immediately under this, will be found the column of exposures he is to use corresponding to the different size stops at the left. The novice will need some explanation here. The column of U. S. stops at the left do not mean United States stops, but Uniform System stops, by which each succeeding stop lets into the camera just one-half of the light as does its preceding one. To illustrate: U. S. stop 8 lets in one-half the light passed by U. S. stop 4; U. S. stop 16, one-half the light passed U.S. stop 8; U.S. stop 32, one-half that passed by U. S. stop 16, and so on. A little familiarity with the subject will show us that this system is a most excellent and convenient one. All lenses, however, are not marked in their U. S. values. some being engraved in their F. values. As the reader may have a lens marked in its F. value, a comparison of the two systems is furnished below:

U. S. Stops: 4 8 16 32 64 128 256 F. " f/8 f/11.3 f/16 f/22.6 f/32 f/45.2 f/64

It will be noticed in the tables that not only the regular U. S. stops are given, but also + stops are given. We are to understand by this that the + stops are half-way stops. Thus, 4+ means a stop half-way between 4 and 8, and so on. This gives the exposure columns a corresponding greater range, as will be seen by inspection. In setting the iris diaphragm for the + stops, the pointer should be set a little over half the

way between in order to properly get the half-way stop. A few words now concerning the exposure columns. The exposures are, of course, in seconds, or fractions of a second. Some have been omitted, as will be seen. Their places are supplied by a dash. The reason of this is, they represent fractions that could not be either expanded or squeezed into usable shape. It is much better for the operator to have before him only such exposures as his shutter or his bulb can execute.

Another Method

It may here be explained that there are a number of ways in which a proper exposure may be gotten, regardless of the latitude and longitude of the locality, the season of the year, or the time of the day. The only requirement is that the sun must be shining. Two of these are given.

The first is, by stepping one's own shadow. A person usually steps in regular, natural step, about 40 per cent of his own height, and it is easy to compute mathematically the length of his shadow on level ground, at given altitudes of the sun. On reasonably level ground let the operator note the point where his shadow reaches. Then let him measure the distance of this point in his usual steps. The table below will correctly give the proper exposures.

U. S. Stops:	23 steps	15 steps	II steps	7 steps	5 steps	3 steps	1½ steps
4 · · · · · · · · · · · · · · · · · · ·	1/10 1/5 1/4	1/10 1/5	1/25 1/10	1/25	1/50 1/25	1/75 1/50 1/25	1/100 1/75 1/50
16 · · · · · · · · · · · · · · · · · · ·	1/2 3/4	1/4 1/2 3/4	1/5 1/4 1/2	 1/5 1/4	1/10	1/10 1/5	1/25 1/10
64 64+ 128 128+ 256	1 1/2 2 3 4 6	1 1 1/2 2 3 4	3/4 1 1 1/2 2	1/2 3/4 1 1 1/2 2		1/4 1/2 3/4	1/5 1/4 1/2 3/4

A Second Method The simple diagram given after the regular tables in this little work. Let the reader make an exact copy of this, paying particular attention to the angles, and then paste the copy upon a bit of heavy cardboard. If the device then be held in a vertical direction, the top edge conforming with the horizon and its face so turned that the sun will just light it, a pin stuck, or the point of a pencil held, at the point P, will cast a shadow giving the proper angle. This little device is very practicable, and the writer prefers its use to the tables in bright weather.

Normal or Basic Conditions

The reader is now to be told that all of the foregoing applies to what may be called normal or basic conditions. That is, it applies to an average scene, bright

weather and fastest plates. Some one may ask here: What about the lens? We are not going to discuss lenses, but we will say this much: Correctly speaking, we cannot compare lenses as fast and slow, excepting that some may be bright and clean and others dull and dirty. What is meant by a fast lens is that it will give good definition with a large aperture or stop. If the reader has a lens which permits the use of the back combination alone, he probably knows that in the use of this combination the markings of the stops on his lens are all upset. He must compute a new set of stops for his lens in that condition, and, in order to properly do such kind of work, let him refer to such authorities as that cited above.

Let us now return to the consideration of the normal or basic conditions of exposure. The majority of outdoor exposures come under these conditions, but of course many do not. When they do not, you must still hold to your table, but modify its results. Suppose, for instance, the normal exposure given by the table is ½-second for a certain stop, and you judge the condition of the atmosphere to be such that the normal exposure should be doubled. You then, of course, make the exposure at 1 second. In other words, you must multiply the exposure of your table by all of the modifying factors, and the result will be the exposure for

Let us now consider the nature and extent of

these modifying conditions:

Some writers attempt to give hard and Conditions fast rules for atmospheric conditions, of the and direct certain exposures for mod-Atmosphere erate, dull, very dull, gloomy, very gloomy, etc.; but the endless variation of conditions does not seem to lend itself to any such fixed treatment. What is dull, very dull, etc., will be different in different judgments; and surely no fixed rule is ever applicable, unless there is some certain means of fixing the data upon which the rule is based. Therefore we pro-

pose to handle the subject with more caution.

We are probably justified in saying that light varying from the brightest sunshine to the gloomiest weather will require corresponding exposures of from 1 to 5. There are phenomenal conditions which would probably exceed 10, but photographs are not likely to be taken under such conditions. For ordinary work no experienced photographer would care to expose plates, without special need, where the conditions of the atmosphere call for an exposure of as much as 3 times bright Indeed, the best taste, untrammeled by sunlight. requirements, would usually demand a condition bright enough to give some direct sun lighting. Still, there are certain pictorial effects that call for dull lighting, and there are sometimes requirements which do not admit of choice.

If we assume as 1, the proper exposure for bright sunshine, then experience shows that the following conditions of the atmosphere require factors about as given

below:

A. Bright sunshine, with detached masses of brilliantly lighted clouds reflecting into the 2/3 shadows of the scene

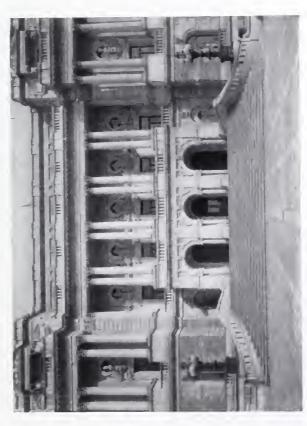
Clouds the same as A, but the sun covered В. by a thin detached cloud through which his disk may be distinctly seen, and causing light shadows to be cast by objects. It is to be noted that this is a suitable condition for good photographs, even in

C. Sun the same as B, but no detached clouds reflecting into the scene. This condition
is even more suitable for photographs in
the middle of the day than is B 1 1/2
D. Sun covered by dense detached cloud.
Other conditions same as A. Photographs
under this condition are usually flat and
E. Sun covered as in D, but no detached clouds
reflecting into the scene. Photographs
flat
We may now venture upon the following:
F. When the whole sky is covered by clouds,
but so thin as to enable the eye to see the
sun's disk; an uncommon condition 2
G. When the sun's disk can not be seen, but the
clouds are thin enough to point out his gen-
eral position; a common condition 3
Beyond this, words can not accurately define condi-
tions, and the matter must be left to a judgment
acquired by experience. We will again advise the
reader not to attempt exposures under difficult and
untoward atmospheric conditions, if he has choice in
the matter. It is much better to confine work to the
early mornings and late afternoons in bright weather,
or, if in midday, to those moments when the sun is
behind a very light fleecy detached cloud.
An average scene being taken at I.
Character we may take the following factors for
of Scene others. It must be stated, however,
that some experience will here be required, in order
to enable the learner to put the proper value on the
words used.
H. Distant and open scene
The reasons for this smaller factor are:
1, more open sky; 2, less shadows; 3,
less definition required by the distance.
I. Distant snow or water scenes 1/3
The reasons are the same as the above.
with the added one of greater reflection.
The novice must bear in mind that it is

not the light around the camera, but the light reflected by the scene or objects to the camera, which is to be reckoned with.

in the photographs.

Now, a plate may be given an exposure that would be excessive for an average scene, which requires more or less contrast, whereas the same exposure might be too little for a human face, which requires the softness obtainable by a longer exposure. A portrait from a negative not sufficiently exposed for its purpose will exhibit disagreeable shadows and harshness. To make a portrait outdoors, it is necessary, in order to get softness, to have a rather dark negative - what is called a "hard printer." Of course the surrounding scene will by over-exposure be flat, but in a portrait everything must give way to the face of the person. It may be remarked that outdoor portraiture is rarely satisfactory. The conditions do not usually exist for giving the best The better way to manage is to place the subject or subjects at a little distance and make them a part of the scene; and if their heads are turned aside the result is usually better. But this, of course, is not portraiture, and the exposure must then be timed in reference to the scene.



ENTRANCE TO THE CONGRESSIONAL LIBRARY AT WASHINGTON From a 4 x 5 negative made with a No. 10 needlehole James H. McCorkle



An instantaneous exposure illustrating the possibilities of photography with an anastigmat lens at f4 TEMPLE STATION, METROPOLITAN RAILWAY, LONDON George E. Brown

We come now to one of the most impor-Shadows tant things in exposure. An ordinary photograph is literally nothing but a shadow, or, speaking more correctly, it is but an image of shades and shadows. Unfortunately, however, the subject is one very difficult to specify rules for. When we consider that on a basis of I for an open exposure, the ratio for shadows will vary from 2 to say 30 or more, and the further fact that there are few demarkations along the line, it is apparent that the subject is more one of experience than of definitive words. The rule to "expose for the shadows and let the high lights take care of themselves" is golden, but, in the nature of the case, it is suggestive rather than specific. Generally speaking, even by those who should do better, overexposures are usually made in the open, and underexposures in shadows.

Taking I as the proper exposure in bright sunlight, then when the scene or object is under shadow, but open all around to an oblique sky, as under a detached tree, the exposure may be taken at about 2. If, however, illuminated clouds reflect the light under the tree,

then the factor may be taken at about 11/2.

If a portrait is to be taken in the two cases, then for the first we would have $3 \times 2 = 6$ as compared with the 3 of direct sunlight, and in the second $3 \times 1\frac{1}{2} = 4\frac{1}{2}$.

Under a porch without vines, and few trees in front, the exposure would be about 4, and a portrait should have about $3 \times 4 = 12$. If there were many trees in front, it might run up to double this or more. For cases like these, it is well for the beginner to keep a note-book of his exposures. Exposure meters are good, but there are none so valuable as a plate in a camera, even if this be the more expensive plan, and even if we have to await the development of the plate to know the value of our results.

It may be well to point out that the relative difference of light in the open and under cover is less in dull weather than in bright. That is to say, if the exposure under the shade of a porch would be, say, six times that required in bright sunlight, then on a dull day, while the exposure would be greater in the porch than

on a bright day, yet compared with the open of the dull day, it would be less. This results, of course, from the relatively greater diffusion of light in dull weather

than in bright.

The tables given in this monograph are based on the use of the most rapid **Plates** These, among the best makes, plates. do not very materially differ. The best results, however, are not usually attained with the fastest plates. Those ranging next fastest have better latitude, and are more satisfactory for general use. In using these latter with the tables herein, it will be sufficiently accurate to simply take the next column to the left. There is here no practical occasion to discuss the different brands of plates in the market. The photographer, if he is wise, will for the great bulk of his work confine himself to some one good brand, just as he should do in his choice of a developing agent. He should by experience learn the behavior of his plate for himself, supplemented by what the makers say in their handbooks. In special work he will at times need special plates; non-halation plates, isochromatic plates, etc. But the makers in their little booklets always tell how to use these on the basis of the manipulation of their common brands.

The photographer can not be too strongly urged to confine himself to the fewest number of materials and methods in the practical parts of his work. He should not be forever dabbling in the well-nigh infinite mechanical and chemical processes of his work. To do a few things well is immeasurably better than to do many things indifferently. By mastering the necessary things, and only the necessary things, one is left free to pursue the real thing—the production of pictures.

It has not been thought necessary, in Temperature the foregoing directions, to make allow-

ances for temperature. It is a well-known fact that all chemical actions are quicker in high temperatures than in low ones. In cold weather, however, by reason of the greater purity of the atmosphere, all other things being equal, the actinic quality of light is greater than in warm weather; and this is further reinforced by the fact that usually plates are kept in a

warm house and otherwise well protected. For these reasons allowances may be neglected. If, however, in cold weather, plates are allowed to get chilled through their wrappings, exposures should be correspondingly increased. The influence of temperature on exposure deserves a larger consideration than has yet been given to it. Necessarily, its intelligent discussion must be based upon experiment rather than upon theory. The paper read by Captain Abney, before the London Camera Club some years ago, is the only discussion of the subject which I have noticed. This paper was reprinted in Wilson's Magazine, June, 1903.

Exposure Shutters

The foregoing tables assume that shutters will accurately perform as registered. Very often this is not the case. If they leave their makers in proper adjustment, a more or less rough usage will often cause them to perform inaccurately. For this reason, operators should use the bulb and time methods as much as possible. A quick pressure and release of the bulb will take about one-fourth of a second. A half-second, and even a three-fourths second, can easily be acquired, and whole seconds may be had by trained counting or by the second-hand of a watch.

There is a greater latitude of exposure Latitude than is realized by many. If this were in Exposure not so, there would be fewer good photographs than there are, considering the haphazard methods employed. But this does not, of course, justify haphazard methods. While it would be in the nature of a miracle to always hit the ideal exposure, yet good practice should approximate it. It is impossible to set exact figures for the latitude of exposures. The latitude depends upon the mechanical and chemical methods used in making the plate, the character of the subject, the amount of light, etc. All other things being equal, a slower plate will give a proportionately greater latitude than will a faster one, a dark subject than a light one, and a subdued light than a bright one. All of this is not true in existing theory, but it is in practice. The theory should mend itself.

TABLE I

This table is computed for north latitude 32° , and is adapted to a scope of latitude of from 30° to 34° . It is computed also in local mean time, and by that time it is correct in all longitudes, i.e., all around the earth, within the above latitude.

FORENOONS							
7.50 7.45 7.30	8.10 8.00 7.50	8.50 8.35 8.20	9.30 9.20 9.05	11.25 10.40			
7.20 7.05 6.50	7.35 7.20 7.05	8.10 7.50 7.35	8.50 8.30 8.05	10.15 9.45 9.25			
6.40 6.25 6.15	$6.55 \\ 6.40 \\ 6.30$	7.25 7.10 7.00	7.55 7.40 7.30	9.20 9.10 9.00	11.20 10.45 10.25		
$6.00 \\ 5.50 \\ 5.45$	$6.15 \\ 6.05 \\ 6.00$	6.45 6.35 6.30	7.15 7.10 7.05	8.45 8.40 8.40	10.05 9.50 9.50		
$6.00 \\ 6.10 \\ 6.20$	6.15 6.25 6.35	$6.45 \\ 6.55 \\ 7.05$	7.20 7.25 7.35	8.50 8.55 9.05	10.00 10.15 10.30		
$6.25 \\ 6.30 \\ 6.40$	6.40 6.45 6.55	7.10 7.15 7.25	7.40 7.45 7.55	9.10 9.10 9.15	10.45 11.10		
6.45 6.50 7.00	7.00 7.05 7.20	7.30 7.40 7.50	8.10 8.20 8.35	9.25 9.45 10.10			
7.15 7.30 7.55	7.30 7.50 8.15	8.05 8.30 9.00	8.50 9.10 9.45	10.55			
1/10 1/5	1/25 1/10	1/25 1/10	1/50 1/25	1/75 1/50 1/25	1/100 1/75 1/50		
1/4 1/2 3/4	1/5 1/4 	1/5 1/4	1/10 1/5 1/4	1/10	1/25		
1 1 1/2 2 3 4	3/4 1 1 1/2 2 3	1/2 3/4 1 1 1/2	1/2 3/4 1 1 1/2	1/4 1/2 3/4 1	1/5 1/4 1/2 3/4		
	7.45 7.30 7.20 7.05 6.50 6.40 6.25 6.15 6.00 5.50 5.45 6.00 6.20 6.25 6.30 6.40 6.45 7.30 7.55 1/10 1/5 1/4 1/2 3/4 1 1 1/2 3	7.50 8.10 7.45 8.00 7.30 7.50 7.20 7.35 7.05 7.20 6.50 7.05 6.40 6.55 6.25 6.40 6.15 6.30 6.00 6.15 6.10 6.25 6.20 6.35 6.20 6.35 6.20 6.35 6.21 6.40 6.55 6.22 6.40 6.55 6.20 6.35 6.25 8.40 6.30 7.30 7.50 7.20 7.15 7.30 7.30 7.50 7.55 8.15 1/25 1/10 1/5 1/4 1/2 1 1/4 1/2 1 1/4 1/2 1 3/4 1/2 1 1/2 3 3/4 1/2 1 1/2 3 3/4	7.50 8.10 8.50 7.45 8.00 8.35 7.30 7.50 8.20 7.20 7.35 8.10 7.05 7.20 7.50 6.50 7.05 7.25 6.40 6.55 7.25 6.25 6.40 7.10 6.15 6.30 7.00 6.00 6.15 6.45 5.50 6.05 6.35 5.45 6.00 6.35 6.20 6.35 7.05 6.20 6.35 7.05 6.20 6.35 7.05 6.21 6.40 7.10 6.30 6.45 7.15 6.40 6.55 7.25 6.40 7.10 6.30 6.45 7.15 6.40 6.55 7.25 6.45 7.00 7.30 6.50 7.05 7.40 7.00 7.20 7.50 7.15 7.30 8.05 7.30 7.50 8.30 7.55 8.15 9.00 1/25 1/10 1/4 1/5 1/2 1/4 1/5 1/4 1/2 1 1/2 1 1/4 1/5 1/4 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1/2 1 1	7.50 8.10 8.50 9.30 7.45 8.00 8.35 9.20 7.30 7.50 8.20 9.05 7.20 7.35 8.10 8.50 7.05 7.20 7.50 8.30 6.50 7.05 7.35 8.05 6.40 6.55 7.25 7.55 6.25 6.40 7.10 7.40 6.15 6.30 7.00 7.30 6.00 6.15 6.45 7.15 5.50 6.05 6.35 7.10 5.45 6.00 6.35 7.05 6.20 6.35 7.05 7.25 6.20 6.35 7.05 6.20 6.35 7.05 6.21 6.42 7.13 7.45 7.25 7.55 6.44 7.10 7.40 6.30 6.45 7.25 6.20 6.35 7.05 6.25 6.55 7.25 6.20 6.35 7.05 7.35 6.25 6.40 7.10 7.40 6.30 6.45 7.15 7.45 6.40 6.55 7.25 7.55 6.45 7.00 7.30 8.10 6.50 7.05 7.40 8.20 7.00 7.20 7.50 8.35 7.15 7.30 8.05 8.50 7.30 7.50 8.30 9.10 7.55 8.15 9.00 9.45 1/2 1/4 1/5 1/25 1/2 1/4 1/5 1/2 1/4 1/5 1/2 1/4 1/5 1/2 1 1/2 1 1/2 1 3/4 1/2 1/4 1/2 1 1/2 1 3/4 1/2 1/4 1/2 1 1/2 1 3/4 1/2 1/4 1/2 1 3/4 1/2 1/4 1/2 1 1/2 1 3/4 1/2 1/4 1/3 3/4 1/2 1/4 1/3 3/4 1/2 1/4 1/3 3/4 1/2 1/4 1/3 3/4 1/2 1/4 1/3 3/4 1/2 1/4 1/3 3/4 1/2 1/4 1/3 3/4 1/2 1/4 1/3 3/4 1/2 1/4 1/3 3/4 1/2 1/4 1/3 3/4 1/2 1/4 1/3 3/4 1/2 1/4 1/3 3/4 1/2 1/4 1/3 3/4 1/2 1/4 1/3 3/4 1/2 1/4 1/3 1/2 1	$\begin{array}{cccccccccccccccccccccccccccccccccccc$		



REPRODUCED FROM A 6½ x8½ NEEDLEHOLE PHOTOGRAPH

It is impossible to get a view of the church including
the spire from this point of view with an ordinary lens

Towne & Whitney, Gardner, Mass.



W. C. Baker

TABLE I

In the United States, this table is adapted to the states of Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina and Texas.

		AFTER	noons			
Jan. 20 4.45 Feb. 5 5.00 Feb. 17 5.15	4.30 4.45 5.00	4.10 4.30 4.40	3.30 3.55 4.10	2.50 3.10 3.25	1.05 1.50	
Feb. 28 5.25 Mch. 10 5.30 Mch. 21 5.35	5.10 5.15 5.20	4.55 5.00 5.05	4.20 4.30 4.35	$3.40 \\ 3.50 \\ 4.05$	2.15 2.35 2.45	
Mch. 30 5.45 April 10 5.50 April 21 6.00	5.30 5.35 5.45	5.15 5.20 5.30	$4.45 \\ 4.50 \\ 5.00$	4.15 4.20 4.30	$2.50 \\ 2.50 \\ 3.00$	12.50 1.15 1.35
May 4 6.05 May 30 6.15 June 21 6.30	5.50 6.00 6.15	$5.35 \\ 5.45 \\ 6.00$	$5.05 \\ 5.15 \\ 5.30$	4.35 4.40 4.55	$3.05 \\ 3.10 \\ 3.20$	$1.45 \\ 2.00 \\ 2.10$
July 23 6.25 Aug. 8 6.15 Aug. 21 6.05	6.10 6.00 5.50	5.55 5.45 5.35	5.25 5.15 5.05	$4.50 \\ 4.45 \\ 4.35$	$3.20 \\ 3.15 \\ 3.05$	$2.10 \\ 1.55 \\ 1.40$
Sept. 2 5.50 Sept. 12 5.35 Sept. 21 5.25	5.35 5.20 5.10	5.20 5.05 4.55	$4.50 \\ 4.35 \\ 4.25$	$4.20 \\ 4.05 \\ 3.55$	$2.50 \\ 2.40 \\ 2.35$	$1.15 \\ 12.40$
Oct. 3 5.10 Oct. 13 4.55 Oct. 24 4.45	4.55 4.40 4.30	4.40 4.25 4.10	$\frac{4.10}{3.50}$ $\frac{3.40}{3.40}$	$3.30 \\ 3.10 \\ 2.55$	$ \begin{array}{r} 2.15 \\ 1.45 \\ 1.20 \end{array} $	
Nov. 6 4.30 Nov. 21 4.25 Dec. 21 4.25	4.15 4.10 4.05	4.00 3.50 3.45	3.25 3.10 3.00	2.40 2.30 2.15	12.35	
U. S. Stops:						
4 1/10 4+ 8 1/5 8+ 1/4	1/10 1/5	1/25 1/10	1/25 1/10	1/50 1/25	1/75 1/50 1/25	1/100 1/75 1/50
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1/4 1/2 3/4	1/5 1/4 	1/5 1/4	1/10 1/5 1/4	1/10 1/5	1/25 1/10
$64 \dots 11/2$ $64 + \dots 2$ $128 \dots 3$ $128 + \dots 4$ $256 \dots 6$	1 1 1/2 2 3 4	3/4 1 1 1/2 2 3	1/2 3/4 1 1 1/2	1/2 3/4 1 1 1/2	1/4 $1/2$ $3/4$ 1	1/5 1/4 1/2 3/4

TABLE II

This table is computed for north latitude 36°, and is adapted to a scope of latitude of from 34° to 38°. It is computed also in local mean time, and by that time it is correct in all longitudes, i.e., all around the earth, within the above latitude.

		FORE	NOONS			
Jan. 20 7.45 Feb. 5 7.35 Feb. 17 7.25	$8.05 \\ 7.55 \\ 7.40$	$8.25 \\ 8.10 \\ 7.55$	9.10 8.55 8.35	9.55 9.35 9.15	11.25	
Feb. 28 7.10 Mch. 10 6.55 Mch. 21 6.35	7.25 7.10 6.55	7.45 7.25 7.15	$8.20 \\ 8.00 \\ 7.45$	8.55 8.35 8.15	$10.40 \\ 10.05 \\ 9.40$	
Mch. 30 6.25 April 10 6.10 April 21 5.55	6.40 6.25 6.15	$6.55 \\ 6.40 \\ 6.30$	7.30 7.05 7.00	$8.00 \\ 7.45 \\ 7.35$	9.20 9.00 8.45	11.15 10.40
May 4 5.40 May 30 5.35 June 21 5.25	$5.55 \\ 5.45 \\ 5.40$	6.10 6.00 5.55	6.45 6.35 6.30	7.15 7.05 7.00	$8.30 \\ 8.20 \\ 8.15$	$10.15 \\ 10.00 \\ 9.55$
July 23 5.45 Aug. 8 5.50 Aug. 21 6.00	$5.55 \\ 6.05 \\ 6.20$	$6.10 \\ 6.20 \\ 6.35$	$6.45 \\ 6.55 \\ 7.05$	7.15 7.25 7.40	$8.30 \\ 8.40 \\ 8.50$	10.10 10.25 10.45
Sept. 2 6.10 Sept. 12 6.15 Sept. 21 6.25	6.25 6.30 6.45	$6.40 \\ 6.45 \\ 7.05$	7.05 7.20 7.35	7.45 7.50 8.05	9.00 9.10 9.30	11.15
Oct. 3 6.35 Oct. 13 6.40 Oct. 24 6.55	$6.50 \\ 6.55 \\ 7.10$	7.05 7.15 7.25	7.40 7.50 8.05	8.15 8.25 8.45	9.45 10.10 10.55	
Nov. 6 7.05 Nov. 21 7.25 Dec. 21 7.50	7.25 7.45 8.10	7.40 8.05 8.30	8.25 8.50 9.25	9.05 9.35 10.15		
U. S. Stops:						
4 1/10 4 +	1/10 1/5	1/25 1/10	1/25 1/10	1/50 1/25	1/75 1/50 1/25	1/100 1/75 1/50
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1/4 1/2 3/4	1/5 1/4 1/2	1/5 1/4	1/10 1/5 1/4	1/10 1/5	1/25 1/10
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} 1 \\ 1 \\ 2 \\ 3 \\ 4 \end{array}$	3/4 1 1 1/2 2 3	1/2 3/4 1 1 1/2 2	1/2 3/4 1 1 1/2	1/4 1/2 3/4 1	1/5 1/4 1/2 3/4

TABLE II

In the United States, this table is adapted to the states of Arkansas, Southern California, Kentucky, North Carolina, Tennessee and Virginia.

AFTERNOONS							
Jan. 20 4.35 Feb. 5 4.55 Feb. 17 5.05	4.15 4.35 4.50	3.55 4.20 4.35	3.10 3.35 3.55	2.25 2.55 3.15	1.05		
Feb. 28 5.20 Mch. 10 5.25 Mch. 21 5.35	5.05 5.10 5.15	$4.45 \\ 4.55 \\ 5.00$	4 10 4.20 4.25	$3.35 \\ 3.45 \\ 3.55$	$1.50 \\ 2.15 \\ 2.30$		
Mch. 30 5.45 April 10 5.50 April 21 6.05	5.30 5.35 5.45	$5.15 \\ 5.20 \\ 5.30$	$4.40 \\ 4.55 \\ 5.00$	4.10 4.15 4.25	$2.50 \\ 3.00 \\ 3.15$	12.45 1.20	
May 4 6.10 May 30 6.15 June 21 6.35	5.55 6.05 6.20	$5.40 \\ 5.50 \\ 6.05$	5.05 5.15 5.30	4.35 4.45 5.00	$3.20 \\ 3.30 \\ 3.45$	1.35 1.50 2.05	
July 23 6.25 Aug. 8 6.20 Aug. 21 6.10	$6.15 \\ 6.05 \\ 5.50$	6.00 5.50 5.35	5.25 5.15 5. 05	$4.55 \\ 4.45 \\ 4.30$	$3.40 \\ 3.30 \\ 3.20$	$2.00 \\ 1.45 \\ 1.25$	
Sept. 2 5.35 Sept. 12 5.35 Sept. 21 5.25	5.35 5.20 5.05	$5.20 \\ 5.05 \\ 4.45$	$4.55 \\ 4.30 \\ 4.15$	4.15 4.00 3.45	$3.00 \\ 2.40 \\ 2.20$	12.45	
Oct. 3 5.05 Oct. 13 4.50 Oct. 24 4.35	4.50 4.35 4.20	4.35 4.15 4.05	$\frac{4.00}{3.40}$ $\frac{3.25}{3.25}$	$3.25 \\ 3.05 \\ 2.45$	1.55 1.20 12.35		
Nov. 6 4.25 Nov. 21 4.15 Dec. 21 4.10	4.05 3.55 3. 5 0	3.50 3.3 5 3.30	3.05 2.50 2.35	2.25 2.05 1.45			
U. S. Stops:							
4 · · · · · 1/10 4 + · · · · · · · · · · · · · · · · · ·	1/10 1/5	1/25 1/10	1/25 1/10	1/50 1/25	1/75 1/50 1/25	1/100 1/75 1/50	
16	1/4 1/2 3/4	1/5 1/4 1/2	1/5 1/4	1/10 1/5 1/4	1/10	1/25 1/10	
$64 \dots 1 \frac{1}{2}$ $64 + \dots 2$ $128 \dots 3$ $128 + \dots 4$ $256 \dots 6$	1 1 1/2 2 3 4	3/4 1 1 1/2 2 3	$ \begin{array}{r} 1/2 \\ 3/4 \\ 1 \\ 1 \\ 1/2 \\ \end{array} $	1/2 3/4 1 1 1/2	1/4 $1/2$ $3/4$ 1	1/5 1/4 1/2 3/4	

TABLE III

This table is computed for north latitude 40° , and is adapted to a scope of latitude of from 38° to 42° . It is computed also in local mean time, and by that time it is correct in all longitudes, i.e., all around the earth, within the above latitude.

FORENOONS

FORENOONS							
Jan. 20 8.00 Feb. 5 7.45 Feb. 17 7.30	8.20 8.05 7.50	$8.40 \\ 8.25 \\ 8.05$	9.30 9.10 8.40	10.30 10.00 9.30			
Feb. 28 7.15 Mch. 10 6.55 Mch. 21 6.40	7.35 7.15 6.55	7.50 7.30 7.10	$8.25 \\ 8.05 \\ 7.45$	$9.10 \\ 8.45 \\ 8.25$	11.25 10.30 9.55		
Mch. 30 6.25 April 10 6.05 April 21 5.50	$6.40 \\ 6.25 \\ 6.10$	$6.55 \\ 6.40 \\ 6.25$	$7.30 \\ 7.15 \\ 7.00$	8.05 7.50 7.35	9.35 9.10 9.00	11.10	
May 4 5.35 May 30 5.20 June 21 5.10	5.50 5.35 5.30	6.05 5.55 5.50	$6.40 \\ 6.30 \\ 6.25$	7.15 7.05 7.00	$8.40 \\ 8.25 \\ 8.15$	10.30 10.10 10.00	
July 23 5.30 Aug. 8 5.45 Aug. 21 5.55	$5.45 \\ 6.00 \\ 6.15$	$6.05 \\ 6.15 \\ 6.30$	$6.40 \\ 6.50 \\ 7.05$	7.15 7.25 7.40	$8.35 \\ 8.50 \\ 9.05$	10.20 10.40 11.15	
Sept. 2 6.05 Sept. 12 6.15 Sept. 21 6.30	$6.25 \\ 6.30 \\ 6.45$	$6.40 \\ 6.45 \\ 7.00$	7.15 7.20 7.35	7.50 7.55 8.15	9.10 9.25 9.45		
Oct. 3 6.35 Oct. 13 6.45 Oct. 24 7.00	6.55 7.05 7.20	7.10 7.20 7.35	7.45 7.55 8.10	$8.25 \\ 8.40 \\ 9.00$	10.10 10.55		
Nov. 6 7.15 Nov. 21 7.40 Dec. 21 8.05	7.35 8.00 8.30	7.55 8.20 8.50	8.40 9.10 9.50	9.35 10.10 11.15			
U. S. Stops:							
4 1/10 4	1/10 1/5	1/25 1/10	1/25 1/10	1/50 1/25	1/75 1/50 1/25	1/100 1/75 1/50	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1/4 1/2 3/4	1/5 1/4 	1/5 1/4	1/10 1/5 1/4	1/10	1/25	
$64 \dots 1 \frac{1}{2}$ $64 + \dots 2$ $128 \dots 3$ $128 + \dots 4$ $256 \dots 6$	1 1 1/2 2 3 4	3/4 1 1 1/2 2 3	1/2 3/4 1 1 1/2 2	1/2 3/4 1 1 1/2	1/4 1/2 3/4 1	1/5 1/4 1/2 3/4	

TABLE III

In the United States, this table is adapted to the states of Northern California, Colorado, Connecticut, Delaware, District of Columbia, Illinois, Indiana, Iowa, Kansas, Maryland, Missouri, Nebraska, Nevada, New Jersey, Southeastern New York, Ohio, Pennsylvania, Rhode Island and West Virginia.

AFTERNOONS							
Jan. 20 4.20 Feb. 5 4.45 Feb. 17 5.00	$4.00 \\ 4.25 \\ 4.40$	$3.40 \\ 4.05 \\ 4.25$	$2.50 \\ 3.20 \\ 3.50$	1.50 2.30 3.00			
Feb. 28 5.15 Mch. 10 5.25 Mch. 21 5.30	$4.55 \\ 5.05 \\ 5.15$	4.40 4.50 5.00	4.05 4.15 4.25	$3.20 \\ 3.35 \\ 3.45$	1.05 1.50 2.15		
Mch. 30 5.45 April 10 5.55 April 21 6.10	5.30 5.35 5.50	5.15 5.20 5.35	4.40 4.45 5. 00	$4.05 \\ 4.10 \\ 4.25$	2.35 2.50 3.00	12.50	
May 4 6.15 May 30 6.30 June 21 6.50	$6.00 \\ 6.15 \\ 6.30$	$5.45 \\ 5.55 \\ 6.10$	5.10 5.20 5.35	4.35 4.45 5.00	$3.10 \\ 3.25 \\ 3.45$	$1.20 \\ 1.40 \\ 2.00$	
July 28 6.40 Aug. 8 6.25 Aug. 21 6.15	6.25 6.10 5.55	$6.05 \\ 5.55 \\ 5.40$	5.30 5.20 5.05	$4.55 \\ 4.45 \\ 4.30$	$3.35 \\ 3.20 \\ 3.05$	1.50 1.30 12.55	
Sept. 2 5.55 Sept. 12 5.35 Sept. 21 5.20	5.35 5.20 5.05	$5.20 \\ 5.05 \\ 4.50$	4.45 4.30 4.15	4.10 3.55 3.35	$2.50 \\ 2.25 \\ 2.05$		
Oct. 3 5.05 Oct. 13 4.45 Oct. 24 4.30	$4.45 \\ 4.25 \\ 4.10$	4.30 4.10 3.55	3.55 3.35 3.20	3.15 2.50 2.30	1.30 12.35		
Nov. 6 4.15 Nov. 21 4.00 Dec. 21 3.55	3.55 3.40 3.30	3.35 3.20 3.10	$2.50 \\ 2.30 \\ 2.10$	2.00 1.30 12.45			
U. S. Stops:							
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1/10	1/25 1/10	1/25 1/10	1/50 1/25	1/75 1/50 1/25	1/100 1/75 1/50	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1/4 1/2 3/4	1/5 1/4 	1/5 1/4	1/10 1/5 1/4	1/10 1/5	1/25 1/10	
$64 \dots 11/2$ $64 + \dots 2$ $128 \dots 3$ $128 + \dots 4$ $256 \dots 6$	1 1 1/2 2 3 4	3/4 1 1 1/2 2 3	1/2 3/4 1 1 1/2 2	1/2 3/4 1 1 1/2	1/4 1/2 3/4 1	1/5 1/4 1/2 3/4	

TABLE IV

This table is computed for north latitude 44° , and is adapted to a scope of latitude of from 42° to 46° . It is computed also in local mean time, and by that time it is correct in all longitudes, i.e., all around the earth, within the above latitudes.

		FOREN	ROONS			
Jan. 20 8.15 Feb. 5 8.00 Feb. 17 7.40	$8.40 \\ 8.20 \\ 8.00$	9.00 8.40 8.20	10.10 9.50 9.20	11.40 10.35 9.55		
Feb. 28 7.20 Mch. 10 7.00 Mch. 21 6.40	$7.40 \\ 7.15 \\ 6.55$	8.00 7.35 7.15	8.50 8.15 7.55	9.25 9.00 8.35	10.25	
Mch. 30 6.25 April 10 6.05 April 21 5.50	$6.40 \\ 6.20 \\ 6.05$	$7.00 \\ 6.40 \\ 6.25$	7.35 7.15 7.00	8.15 7.55 7.35	9.55 9.25 9.05	
May 4 5.25 May 30 5.10 June 21 5.00	$5.45 \\ 5.30 \\ 5.20$	$6.05 \\ 5.50 \\ 5.40$	$6.40 \\ 6.25 \\ 6.15$	7.15 7.00 6.55	8.40 8.20 8.10	11.05 10.30 10.20
July 23 5.20 Aug. 8 5.35 Aug. 21 5.55	$5.40 \\ 5.55 \\ 6.10$	$6.00 \\ 6.15 \\ 5.30$	6.35 6.50 7.05	7.10 7.25 7.40	8.30 8.50 9.10	10.40 11.1 5
Sept. 2 6.05 Sept. 12 6.15 Sept. 21 6.30	$6.20 \\ 6.30 \\ 6.45$	$6.40 \\ 6.50 \\ 7.05$	7.15 7.25 7.45	7.55 8.05 8.25	9.25 9.45 10.15	
Oct. 3 6.40 Oct. 13 6.50 Oct. 24 7.10	$6.55 \\ 7.10 \\ 7.30$	7.15 7.30 7.50	7.55 8.20 8.50	8.40 8.55 9.25		
Nov. 6 7.30 Nov. 21 7.55 Dec. 21 8.25	7.50 8.20 8.50	$8.10 \\ 8.40 \\ 9.15$	9.20 9.50 10.25	10.05 11.20		
U. S. Stops:						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1/10	1/25 1/10	1/25 1/10	1/50 1/25	1/75 1/50 1/25	1/100 1/75 1/50
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1/4 1/2 3/4	1/5 1/4 	1/5 1/4	1/10 1/5 1/4	1/10 1/5	1/25 1/10
64 1 1/2 $64+ 2$ $128 3$ $128+ 4$ $256 6$	1 1 1/2 2 3 4	3/4 1 1 1/2 2 3	$1/2 \\ 3/4 \\ 1 \\ 1 \\ 1/2 \\ 2$	1/2 3/4 1 1 1/2	1/4 $1/2$ $3/4$ 1	1/5 1/4 1/2 3/4

TABLE IV

In the United States, this table is adapted to the states of Maine, Massachusetts, Michigan, Minnesota, New Hampshire, Northern and Western New York, Oregon, Vermont and Wisconsin.

		AFTER	NOONS			
Jan. 20 4.05 Feb. 5 4.30 Feb. 17 4.50	$3.40 \\ 4.10 \\ 4.30$	$3.20 \\ 3.50 \\ 4.10$	2.10 2.40 3.10	12.40 1.55 2.35		
Feb. 28 5.10 Mch. 10 5.20 Mch. 21 5.30	$4.50 \\ 5.05 \\ 5.15$	4.30 4.45 4.55	$3.40 \\ 4.05 \\ 4.15$	$3.05 \\ 3.20 \\ 3.35$	1.45	
Meh. 30 5.45 April 10 5.55 April 21 6.10	5.30 5.40 5.55	5.10 5.20 5.35	4.35 4.45 5.00	$3.55 \\ 4.05 \\ 4.25$	2.15 2.35 2.55	
May 4 6.25 May 30 6.40 June 21 7.00	$6.05 \\ 6.20 \\ 6.40$	$5.45 \\ 6.00 \\ 6.20$	$5.10 \\ 5.25 \\ 5.45$	$4.35 \\ 4.50 \\ 5.05$	3.10 3.30 3.50	12.45 1.20 1.40
July 23 6.50 Aug. 8 6.35 Aug. 21 6.15	$6.30 \\ 6.15 \\ 6.00$	$6.10 \\ 5.55 \\ 5.40$	5.35 5.20 5.05	5.00 4.45 4.30	$3.40 \\ 3.20 \\ 3.00$	$1.30 \\ 12.55$
Sept. 2 5.55 Sept. 12 5.35 Sept. 21 5.20	$5.40 \\ 5.20 \\ 5.05$	5.20 5.00 4.45	$4.45 \\ 4.25 \\ 4.05$	4.05 3.45 3.2 5	$2.35 \\ 2.05 \\ 1.35$	
Oct. 3 5.00 Oct. 13 4.40 Oct. 24 4.20	4.45 4.20 4.00	4.25 4.00 3.40	$3.45 \\ 3.10 \\ 2.40$	$3.00 \\ 2.35 \\ 2.05$		
Nov. 6 4.00 Nov. 21 3.45 Dec. 21 3.35	3.40 3.20 3.10	$3.20 \\ 3.00 \\ 2.45$	2.10 1.50 1.35	1.25 12.20		
U. S. Stops:						
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1/10 1/5 1/4 1/2	1/25 1/10 1/5 1/4	1/25 1/10 1/5 1/4	1/50 1/25 1/10 	1/75 1/50 1/25 	1/100 1/75 1/50 1/25
$32+\ldots 1$ $64 \ldots 11/2$ $64+\ldots 2$ $128 \ldots 3$ $128+\ldots 4$ $256 \ldots 6$	3/4 1 1 1/2 2 3 4	1/2 3/4 1 1 1/2 2 3	1/2 3/4 1 1 1/2	1/4 1/2 3/4 1 1 1/2	1/5 1/4 1/2 3/4	1/5 1/4 1/2 3/4

TABLE V

This table is computed for north latitude 48°, and it is adapted to a scope of latitude of from 46° to 50°. It is computed also in local mean time, and by that time it is correct in all longitudes, i.e., all around the earth, within the above latitude.

		FOREN	oons			
Jan. 20 8.30 Feb. 5 8.10 Feb. 17 7.50	8.55 8.35 8.15	9.25 9.00 8.35	10.40 10.15 9.30	11.45 10.30		
Feb. 28 7.30 Mch. 10 7.05 Mch. 21 6.40	7.50 7.25 7.00	8.10 7.45 7.20	9.00 8.30 8.05	9.50 9.15 8.45	11.10	
Mch. 30 6.25 April 10 6.00 April 21 5.45	$6.40 \\ 6.20 \\ 6.00$	$7.00 \\ 6.40 \\ 6.20$	7.45 7.20 7.00	8.25 8.00 7.40	10.5 5 9.40 9.15	
May 4 5.20 May 30 5.00 June 21 4.50	$5.40 \\ 5.20 \\ 5.10$	$6.00 \\ 5.40 \\ 5.30$	6.40 6.20 6.10	7.20 7.00 6.50	8.50 8.30 8.15	11.00 10.35
July 23 5.10 Aug. 8 5.30 Aug. 21 5.50	5.30 5.50 6.05	5.50 6.10 6.25	6.30 6.50 7.05	7.10 7.30 7.45	$8.40 \\ 9.00 \\ 9.20$	11.10
Sept. 2 6.00 Sept. 12 6.15 Sept. 21 . 6.30	6.20 6.30 6.50	$6.40 \\ 6.50 \\ 7.10$	7.20 7.35 7.55	8.00 8.15 8.35	9.40 10.45 11.00	
Oct. 3 6.45 Oct. 13 7.00 Oct. 24 7.20	7.05 7.20 7.45	7.25 7.40 8.05	8.10 8.30 9.00	8.55 9.20 10.00		
Nov. 6 7.40 Nov. 21 8.10 Dec 21 8.45	8.05 8.35 9.10	8.30 9.05 9.45	9.45 10.20	11.15	,	
U. S. Stops:						- 4 4
4 1/10 4+ 8 1/5 8+ 1/4	1/10	1/25 1/10	1/25 1/10	1/50 1/25	1/75 $1/50$ $1/25$	1/100 1/75 1/50
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1/4 1/2 3/4	1/5 1/4 	1/5 1/4	1/10 1/5 1/4	1/10 1/5	1/25 1/10
64 1 1/2 $64 + 2$ $128 3$ $128 + 4$ $256 6$	1 1 1/2 2 3 4	3/4 1 1 1/2 2 3	1/2 3/4 1 1 1/2 2	1/2 3/4 1 1 1/2	1/4 $1/2$ $3/4$ 1	1/5 1/4 1/2 3/4

TABLE V

This table is adapted for use in North Dakota, Montana, Washington, Newfoundland, Nova Scotia, Lower Canada and the Canadian Border from Lake Superior to the Pacific,

		AFTER	NOONS			
Jan. 20 3.50 Feb. 5 4.20 Feb. 17 4.40	3.25 3.55 4.15	2.55 3.30 3.55	$1.40 \\ 2.15 \\ 3.00$	12.45 2.00		
Feb. 28 5.00 Mch. 10 5.15 Mch. 21 5.30	4.40 4.55 5.10	$4.20 \\ 4.35 \\ 4.50$	$3.30 \\ 3.50 \\ 4.05$	2.40 3.05 3.25	1.00	
Mch. 30 5.45 April 10 6.00 April 21 6.15	5.30 5.40 6.00	5.10 5.20 5.40	$4.25 \\ 4.40 \\ 5.00$	$3.45 \\ 4.00 \\ 4.20$	1.15 2.20 2.45	
May 4 6.30 May 30 6.50 June 21 7.10	6.10 6.30 6.50	5.50 6.10 6.30	5.10 5.30 5.50	4.30 4.50 5.10	3.00 3.20 3.45	12.50 1.25
July 23 7.00 Aug. 8 6.40 Aug. 21 6.20	$6.40 \\ 6.20 \\ 6.05$	6.20 6.00 5.45	5.40 5.20 5.05	5.00 4.40 4.25	$3.30 \\ 3.10 \\ 2.50$	1.00
Sept. 2 6.00 Sept. 12 5.35 Sept. 21 5.20	5.40 5.20 5.00	5.20 5.00 4.40	4.40 4.15 3.55	4.00 3.35 3.15	2.20 1.05 12.50	
Oct. 3 4.55 Oct. 13 4.30 Oct. 24 4.10	4.35 4.10 3.45	$4.15 \\ 3.50 \\ 3.25$	3.30 3.00 2.30	$2.45 \\ 2.10 \\ 1.30$		
Nov. 6 3.50 Nov. 21 3.30 Dec. 21 3.15	3.25 3.05 2.50	3.00 2.35 2.15	1.45 1.20	12.15		
U. S. Stops:						
4 1/10 4+	1/10 1/5	1/25 1/10	1/25 1/10	1/50 1/25	1/75 1/50 1/25	1/100 1/75 1/50
16	1/4 1/2 3/4	1/5 1/4 	1/5 1/4	1/10 1/5 1/4	1/10 1/5	1/25 1/10
64 1 1/2 64 + 2 128 3 128 + 4 256 6	1 1 1/2 2 3 4	3/4 1 1 1/2 2 3	1/2 3/4 1 1 1/2 2	1/2 3/4 1 1 1/2	1/4 1/2 3/4 1	1/5 1/4 1/2 3/3

TABLE VI

This table is computed for north latitude 52° , and it is adapted to a scope of latitude from 50° to 54° . It is computed also to local mean time, and by that time it is correct in all longitudes, i.e., all around the earth, within the above latitudes.

		FORE	NOONS			
Jan. 20 8.55 Feb. 5 8.30 Feb. 17 8.05	8.55	10.00 9.25 8.55	10.40 10.05	11.45		
Feb. 28 7.40 Mch. 10 7.10 Mch. 21 6.45	7.30	8.25 7.55 7.25	$9.25 \\ 8.45 \\ 8.15$	$10.25 \\ 9.40 \\ 9.05$		
Mch. 30 6.25 April 10 6.00 April 21 5.40	6.20	$7.05 \\ 6.40 \\ 6.20$	7.50 7.25 7.00	8.35 8.10 7.45	11.05 10.10 9.35	
May 4 5.10 May 30 4.50 June 21 4.35	5.10	5.55 5.35 5.20	$6.35 \\ 6.15 \\ 6.05$	7.20 7.00 6.50	$9.05 \\ 8.40 \\ 8.20$	11.10
July 23 5.00 Aug. 8 5.20 Aug. 21 5.45	5.40	5.45 6.05 6.25	$6.25 \\ 6.45 \\ 7.05$	7.10 7.30 7.50	8.50 9.15 9.40	
Sept. 2 6.00 Sept. 12 6.15 Sept. 21 6.35	6.35	$6.40 \\ 6.55 \\ 7.15$	7.25 7.40 8.05	$8.10 \\ 8.25 \\ 8.55$	10.10 10.55	
Oct. 3 6.50 Oct. 13 7.10 Oct. 24 7.35	7.35	7.35 7.55 8.25	8.25 8.55 9.35	$9.20 \\ 9.55 \\ 11.15$		
Nov. 6 8.00 Nov. 21 8.35 Dec. 21 9.15	9.05	8.55 9.40 10.40	10.10			
U. S. Stops:						
4 · · · · 1/10 4 + · · · · · · · · · · · · · · · · · ·	1 /10	1/25 1/10	1/25 1/10	1/50 1/25	1/75 1/50 	1/100 1/75 1/50
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1/4 1/2 3/4	$\frac{1}{5}$ $\frac{1}{4}$ $\frac{1}{2}$	1/5 1/4	1/10 1/5 1/4	1/10 1/5	1/25 1/10
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1 1 1/2 2 3 4	3/4 1 1 1/2 2 3	1/2 $3/4$ 1 $1 1/2$ 2	1/2 3/4 1 1 1/2	1/4 1/2 3/4 1	1/5 1/4 1/2 3/4

TABLE VI

This table is adapted for use in England, from Land's End to York; the sonthern half of Ireland and north Germany.

		AFTER	NOONS			
Jan. 20 3.25 Feb. 5 4.00 Feb. 17 4.25	2.55 3.35 4.00	2.20 3.05 3.35	1.50 2.25	12.45		
Feb. 28 4.50 Mch. 10 5.10 Mch. 21 5.25	4.25 4.50 5.05	4.05 4.25 4.45	3.05 3.35 3.55	2.05 2.40 3.05		
Mch. 30 5.45 April 10 6.00 April 21 6.20	$5.25 \\ 5.40 \\ 6.00$	$5.05 \\ 5.20 \\ 5.40$	4.20 4.35 5.00	3.35 3.50 4.15	1.05 1.50 2.25	
May 4 6.40 May 30 7.00 June 21 7.25	$6.20 \\ 6.40 \\ 7.05$	5.55 6.15 6.40	5.15 5.35 5.55	4.30 4.50 5.10	2.45 3.10 3.40	12.50
July 23 7.10 Aug. 8 6.50 Aug. 21 6.25	$6.50 \\ 6.30 \\ 6.05$	$6.25 \\ 6.05 \\ 5.45$	5.45 5.25 5.05	5.00 4.40 4.20	3.20 2.55 2.30	
Sept. 2 6.00 Sept. 12 5.35 Sept. 21 5.15	5.40 5.15 4.55	5.20 4.55 4.35	4.35 4.10 3.45	3.50 3.25 2.55	1.50 12.55	
Oct. 3 4.50 Oct. 13 4.20 Oct. 24 3.55	4.30 3.55 3.30	4.05 3.35 3.05	3.15 2.35 1.55	$\begin{array}{c} 2.20 \\ 1.35 \\ 12.15 \end{array}$		
Nov. 6 3.30 Nov. 21 3.05 Dec. 21 2.45	3.05 2.35 2.05	2.35 2.00 1.20	1.20			
U. S. Stops:						
4 · · · · · 1/10 4 + · · · · · · · · · · · · · · · · · ·	1/10 1/5	1/25 1/10	1/25 1/10	1/50 1/25	1/75 1/50 1/25	1/100 1/75 1/50
16 1/2 32 3/4 32 + 1	1/4 1/2 3/4	1/5 1/4 1/2	1/5 1/4	1/10 1/5 1/4	1/10 1/5	1/25 1/10
$64 \dots 1 \frac{1}{2}$ $64 + \dots 2$ $128 \dots 3$ $128 + \dots 4$ $256 \dots 6$	$\begin{array}{c} 1 \\ 1 \\ 1/2 \\ 2 \\ 3 \\ 4 \end{array}$	3/4 1 1 1/2 2 3	$\begin{array}{c} 1/2 \\ 3/4 \\ 1 \\ 1 \\ 1/2 \\ 2 \end{array}$	1/2 3/4 1 1 1/2	1/4 1/2 3/4 1	1/5 1/4 1/2, 3/4

TABLE VII

This table is computed for north latitude 56°, and it is adapted to a scope of latitude from 54° to 58°. It is computed also to local mean time, and by that time it is correct in all longitudes, i.e., all around the earth, within the above latitude.

		FOREN	OONS		
Jan. 20 9.25 Feb. 5 8.50 Feb. 17 8.20	$10.05 \\ 9.25 \\ 8.45$	11.00 10.00 9.15	10.35		
Feb. 28 7.50 Mch. 10 7.20 Mch. 21 6.50	8.15 7.45 7.15	$8.40 \\ 8.10 \\ 7.35$	9.55 9.10 8.35	11.45 10.15 9.30	
Mch. 30 6.25 April 10 5.55 April 21 5.30	6.45 6.15 5. 5 5	7.10 6.40 6.20	8. 0 5 7.30 7.05	8.55 8.20 7.55	11.00 10.05
May 4 5.05 May 30 4.35 June 21 4.15	5.25 5.00 4.40	5.50 5.25 5.05	6.35 6.10 5.55	7.25 7.00 6.45	9.20 8.50 8.35
July 23 4.45 Aug. 8 5.15 Aug. 21 5.35		5.35 6.00 6.25	6.20 6.45 7.10	7.10 7.35 8.00	9.00 9.30 10.10
Sept. 2 5.55 Sept. 12 6.15 Sept. 21 6.40	6.35	6.40 7.00 7.25	7.30 7.55 8.25	$8.20 \\ 8.45 \\ 9.20$	11.00
Oct. 3 7.00 Oct. 13 7.20 Oct. 24 7.50	7.45	7.50 8.10 8.45	$8.50 \\ 9.25 \\ 10.05$	9.55 11.15	
Nov. 6 8.20 Nov. 21 9.05 Dec. 21 9.55	9.45	9.30 10.40			
U. S. Stops:					
4 1/10 4+	1/10	1/25 1/10	1/25 1/10	1/50 1/25	1/75 1/50 1/25
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1/4 1/2 3/4	1/5 1/4 1/2	1/5 1/4	1/10 1/5 1/4	1/10 1/5
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1 1 1/2 2 3 4	3/4 1 1 1/2 2 3	1/2 3/4 1 1 1/2 2	1/2 3/4 1 1 1/2	1/4 1/2 3/4 1



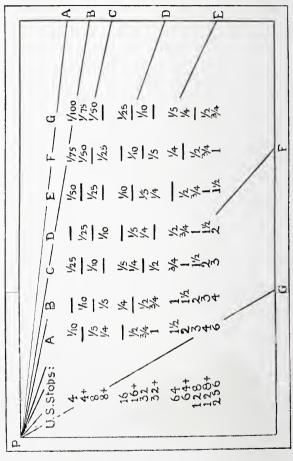


DIAGRAM TABLE OF EXPOSURES
Illustrating the method given on page 249

TABLE VII

This table is adapted for use in England and Scotland from York to Dornoch Firth, the northern half of Ireland, Denmark, and the territory between St. Petersburg and Moscow, Russia.

			AFTER	NOONS		
Jan. 20 Feb. 5 Feb. 17		2.15 3.05 3.45	1.20 2.30 3.15	1.55		
Feb. 28 Mch. 10 Mch. 21	5.00	4.15 4.35 4.55	3.50 4.10 4.35	2.35 3.10 3.3 5	12.45 2.05 2.40	
Mch. 30 April 10 April 21	5.45 6.05 6.30	5.25 5.45 6.05	5.00 5 20 5.40	4.05 4.30 4.55	3.15 3.40 4.05	1.00 1.55
May 4 May 30 June 21	6.45 7.15 7.45	$6.25 \\ 6.50 \\ 7.20$	$6.00 \\ 6.25 \\ 6.55$	5.15 5.40 6.05	4.25 4.50 5.15	2.30 3.00 3.25
July 23 Aug. 8 Aug. 21	7.25 6.55 6.35	7.00 6.35 6.10	6.35 6.10 5.45	5.50 5.25 5.00	5.00 4.35 4.10	3.10 2.40 2.00
Sept. 2 Sept. 12 Sept. 21	6.05 5.35 5 .10	5.45 5.15 4.45	5.20 4.50 4.25	4.30 3.55 3.25	$3.40 \\ 3.05 \\ 2.30$	1.00
Oct. 3 Oct. 13 Oct. 24	4.40 4.10 3.40	4.15 3.45 3.15	3.50 3.20 2.45	$2.50 \\ 2.05 \\ 1.25$	$1.45 \\ 12.15$	
Nov. 6 Nov. 21 Dec. 21	$3.10 \\ 2.35 \\ 2.05$	2.35 1.55 1.05	2.00 1.00			
U. S. Stop	8:					
4 4+ 8 8+	1/10 1/5 1/4	1/10 1/5	1/25 1/10	1/25 1/10	1/50 1/25	1/75 1/50 1/25
16 16+ 32 32+1	1/2 3/4	1/4 1/2 3/4	1/5 1/4 1/2	1/5 1/4	1/10 1/5 1/4	1/10
$64 \dots 1$ $64 + \dots 2$ $128 \dots 3$ $128 + \dots 4$ $256 \dots 6$		$\begin{array}{c} 1 \\ 1 \\ 2 \\ 3 \\ 4 \end{array}$	3/4 1 1 1/2 2 3	$ \begin{array}{r} 1/2 \\ 3/4 \\ 1 \\ 1 1/2 \\ 2 \end{array} $	1/2 3/4 1 1 1/2	1/4 $1/2$ $3/4$ 1

In writing the first part of this little The Second book I have presented the practical or Theoretical method in as popular a form as was pos-Part sible. Wherever permissible, specific Where this was not possible, I rules have been given. have endeavored to explain the matter in such a way as to lead the reader to an intelligent understanding of the detail discussed. In short, my whole effort was given to put the easily understood tables into the hands of the reader, with instructions for their successful use, without more discussion of theory or principles than was absolutely necessary. Those who have grasped the working of the tables, as explained, have already knowledge sufficient to make accurate exposures in the large majority of cases. We can now pass to a brief review of the factors which influence or modify exposure, together with some account of the computation of the tables which are the outcome of the principles herein stated.

This monograph is concerned only Why Outdoor with exposures out-of-doors, because Exposures indoor exposures would necessitate an Only entirely different treatment. It is wise to do one thing well, and this often means that we must isolate the subject from others which, though apparently of the same class, demand consideration from a wholly different viewpoint. Outdoor work usually requires brilliancy as one of its chief characteristics, whereas indoor work, especially portraiture, calls for softness, so that the two fields cannot be satisfactorily handled The light out-of-doors is intense, and not subject to control, whereas the light indoors is subdued and may be modified and controlled in many ways. Similarly, the other conditions affecting exposure are so dissimilar that it is folly to attempt to deal with them as of the same class.

The Importance of the Exposure
is necessarily the basis of all our work. In this, whether we want pictorial effect or technical excellence, the most important factor is the exposure of the plate.

Many practical photographers are impatient of any rules or system governing exposure. By long and extended experience, usually under conditions chiefly remarkable for their uniformity, they have acquired an intuitive judgment as to the proper exposure under this or that normal condition, and they ask nothing more. There are not wanting signs that this content is hardly universal. A system of exposure recently advocated for studio work has been received with unlooked-for appreciation and enthusiasm. The system herein explained is chiefly addressed to beginners. At the same time, I hope that a careful consideration of it will recommend it even to the conservative professional worker and aid him in working under difficult or unusual conditions in outdoor photography.

These fall into two divisions: those which may reasonably be made the subjects of fixed rules, and others which more properly belong to an experienced and enlightened judgment—to frame rigid rules for which would, in the end, produce more harm than good. For the former, the attempt has been made to bring some order out of much existing confusion, by the setting forth of accurate and practical tables. For the latter we have attempted to discuss their nature in such a manner as will lead to the acquisition of a sound

judgment.

We may here stop to consider the familiar injunction to expose according to the light of the image upon the ground-glass. Now, if the inexperienced could only do this, they would have no use for tables. And, by the way, it seems difficult to understand why some one has not improved this injunction in its simplicity and directness by ruling that the exposure should be made in accordance with light of the image reflected direct to the eye—thus leaving out the ground-glass altogether. Surely any reasonable mind will grant that the one is as easy of acquirement as the other, although some would probably prefer that kind of experience which comes by keeping their heads under a black cloth in the summer-time. Now all of this is round about, and brings us to the obvious rule, to expose according to the light. How to

do this without months of trial and the sacrifice of hundreds of plates is the object of a treatise on exposure. If a man has the experience, and can rightly apply his experience, he needs no tables; but for him to tell another man, without experience, to expose either by the light on the ground-glass or in his eye, is much like telling an unlettered man to read a book.

The elements which govern exposure are the following: (1) the altitude of the sun; (2) the size of the stop; (3) the sensitiveness of the plate; (4) the condition of the atmosphere; (5) the extent and importance of the shadows; (6) the distance of the scene or

objects; (7) the coloring of the objects.

Besides these, there are other points set forth in the preceding pages under the discussion of the foregoing heads. The first three elements may reasonably be made the subjects of more or less exact rules. The remainder are more properly matters of judgment, to be carefully examined and considered, rather than dogmatized upon. Of the first three, the effect of the altitude of the sun should first claim our attention.

In undertaking a work it may seem Defects of invidious to attack similar work done by posure Tables others; but the fact is that this task would never have been undertaken had such tables as are available been satisfactory, or even Such tables are practical in important conditions. usually based upon solar time, although their authors do not generally have the thoughtfulness to so tell their readers. As a consequence the uninformed in using them are often led into great errors. In the middle of the day, when tables are little needed, they will answer very well; but in the early and late portions of the day, when outdoor photography is really worth while, these tables are greatly in error, when used by the running time of one's watch. Let us take an example: In almost all the tables published the same exposure is given, for instance, for 7 A. M. as for 5 P.M. This is correct for solar time, for at both hours by that time, the sun is just five hours from the meridian, and consequently of the same altitude. But if our watches run by local mean time, our locality on the 40° parallel of latitude, time of the year the middle of November, then at 7 A. M. by our watches the sun is just about 12 minutes high. However, if we wait until the afternoon, at 5 P. M. the sun will be about 18 minutes below the horizon. If, instead of local mean time, our watches are set to standard time, and in our locality the latter is, say, 20 minutes slower than the former, then at 7 A. M. the sun will be about 32 minutes high, whereas at 5 P. M. he will have gone to bed about 38 minutes past. If in the tables the exposure was correctly given for solar time, by which, under the data given, the sun would be just about 3 minutes under the horizon, then at 7 A. M. by our watches, the exposure would be ruinously great, whereas at 5 P. M., owing to the darkness, it would be impossible to get any exposure at all.

These are extreme cases, but errors of greater or less extent will follow the other portions of the year and other localities. However, let it be assumed we are made acquainted with the fact that we must convert our watch time into solar time before we are to use the tables. We must then hunt up an almanac and find the equation of time for that particular day, and if we are going by standard time we must still further combine the result for this difference. But, owing to the daily change of the equation of time (the sun fast and sun slow of the almanac), we are not permitted to do this once for all, but are required to go over this bothersome work whenever, in the early or late portions of the day, we take out our cameras. As a result of all this, we will likely throw our tables aside in disgust. Consequently, exposure tables, to be really practical. must accord with the kind of time given by our watches.

Limited to Certain
Latitudes

O'clock at New Orleans, La.; at about 4.30 at Chicago, Ills., and about 3.45 at London, Eng. Also: At noon on the 21st of December his altitude is about 36° at New Orleans, about 24° at Chicago, and about 12° at London.

From this showing it is evident that different latitudes

require different exposure tables. For medium latitudes, from four to five degrees, two to two and a-half on each side, is about as much as such tables can be

made to cover with any degree of accuracy.

Owing to the rapid changes of light, Omit Imporand especially the changes of its actinic tant Details properties during the early and late hours of the day, another important requirement of an exposure table is that it should divide those hours into intervals. Near the noon hour the difference of light for several hours is quite imperceptible, but when the sun is near the horizon the difference of a half hour's time is enormous. It can not be too much insisted that the early and late intervals of an exposure table are the important ones. In the middle of the day the matter is not of much moment; in fact, a table is hardly worth while. By the exposure of a few plates in that portion of the day, in the different seasons of the year, almost any one can soon "catch on." If we need exposure tables at all, we need them in the ascending and descending portions of the day, and to be really serviceable they should not jump by hours, but proceed by the unbroken line of our exposure series-it matters not how short the intervals of time necessary to match them. The importance of due attention to the early and late portions of the table is not altogether on account of having a complete table, but also for the reason that those portions are the most likely to be used. At such times subjects for photographing are usually at their The average subject taken in the full glare of the noonday sun is seldom as effective as one taken when the shadows are long, and the sloping sun more gently lights the exposed portions of the scene. This, however, must not be carried too far. We had best not make exposures too late. Good art in outdoor photography usually requires some patches of direct sunlighting. A scene without some direct lighting is apt to appear gloomy. It is not analogous to what we see with our eyes, nor to the pictures of the oil or watercolor painter. These have the advantage of color to lighten the scene, whereas the substance of an ordinary photograph is light and shade only. This is one of its limitations, and it is well to understand the limits of our art. As a general rule, we should have some direct light in our outdoor photographs. Of course there are many exceptions, but, speaking generally, we had best not make exposures on scenery when the sun is less than about half an hour high. This does not, of course, apply to distant water views, nor to open and distant

landscapes.

Of the two extremes, however, the noonday photograph is the worst. For our contention we may further add the practical reason that, in the later portion of the day, it is usually more convenient, as well as more pleasant, to take out our cameras. All of the foregoing should make it plain that our exposure tables, to be really practical, should correctly extend into the early and late portions of the day, and be divided into smaller intervals for those hours-corresponding to the unbroken series of exposure. But it may be further reinforced by the following considerations: perienced persons in photography naturally have the greatest difficulty in judging of the difference of light, especially its actinic difference, between the noon and a late afternoon hour. Here they are in special need of assistance. A normal pair of eyes which at one time can with ease read by the brilliant light of a noonday sun, and at another time with equal ease by the light of an ordinary candle, must have a wonderful power of adaptation. Our senses judge of things by comparison, but after the eye has adapted itself to a changed light it has completely lost the sensuous power of comparison. If, after this occurs, there exists any knowledge at all, it is a mental one. And if there is no mental one we are lost in an unguided imagination. It is much like this: If we ask a dozen persons the size of a distant terrestrial object, they will all usually give us reasonably correct answers. If, however, we ask them how large the moon appears to them, they will give us the most diverse of replies. In the first instance they consciously or unconsciously make use of contiguous objects as a means of comparison, whereas in the second, having no means of comparison, their judgments are the prey of their unguided imaginations.

Now as exposure tables are chiefly made for the inexperienced, it is important that they should fully cover those portions of the day in which such persons will naturally find the greatest difficulties.

Need More
Frequent
Dates

Mother requirement of such tables is that they should give more frequent dates during the year than they usually do. A justification of this requirement do the may be inferentially drawn from a consideration of the

preceding tables.

Rather than give inadequate and faulty tables, it would be much better to simply direct the learner to give a certain exposure when he judges the sun to be half an hour high, and certain ones in the different seasons at midday, and then leave him to exercise his judgment, crude as that may be, as to the intermediates.

The exposure tables furnished in the preceding pages were, respectively, computed astronomically for latitudes north 32°, 36°, 40°, 44°, 48°, 52° and consequently, by that time they are applicable on their

several parallels of latitude for all longitudes.

It will be noticed that the tables are not by regular months, or regular portions of months. The reason for this is that neither the rate of the sun's declination, nor that of his equation of time, is regular in the rate of time.

Hence, for a more uniform accuracy, the rates of these have been equated, leaving the dates to fall as they may.

It will further be noticed that in the tables the intervals are not regular hours, nor regular portions of hours. The only concession is that the intervals have been rounded to the nearest five minutes. The propriety of this feature will be recognized by the following considerations. The tables were computed in this manner: It was first established at what different altitudes the sun would have to be in order to match the series of exposures adopted. The problem then was to compute, under the different declinations of the sun during the year, the precise times during the days when he reached these established altitudes. The results

were then corrected by the equation of time, for mean time. It will naturally be supposed that these intervals usually fell upon no regular hours or regular portions of hours. However, as a concession, as before said, they have been rounded to the nearest five minutes.

It will be noticed that the exposures in the tables do not always follow in the precise sequence of the exposure series, which sequence is, 1/12, 1/16, 1/25, 1/33, 1/50, 1/67 and 1/100. In other words, some of them have been slightly squeezed or expanded into usable shape. To leave the task of squeezing or expanding these to the hesitating operator, seems to be shirking a responsibility by the table-maker. It will also be observed that some are omitted altogether. These were so unmanageable that they could not be squeezed or expanded for use without giving unallowable errors, consequently their places were thought best occupied by a dash. The fact is, any table seems crude and unsatisfactory which presents to the operator fractions which neither he nor any shutter in the market can execute. It is true that there is no fraction which can not be executed by means of the sliding device of the iris diaphragm. But this would require such a refined computation that, in practice, the attempt would be ridiculous. Many shutters will not execute all of the fractions given in the tables, but there are none given which some shutters will not execute.

The Basis of the Tables

When physical subjects will admit of a rigorous examination, physicists always prefer that method to an empirical one, for the reason that the former furnishes the chief natural law, from which modifications may be intelligently made. If we have a mathematical formula, expressing the fundamental theory of certain phenomena, then we have a sound working basis to guide us in our allowances for aberrations.

We shall here adopt that method in the examination of the light corresponding to the different altitudes of the sun. No effort will be made to push the investigation below a height of sun of about six degrees above the horizon. For the middle latitudes of the earth, expressed in time, six degrees of altitude will, for

average seasons, represent about one-half an hour of the sun's height. It has already been suggested that for normal work some direct lighting for artistic effect must be had.

Further than this, such is the uncertain condition of the atmosphere below that height, that an attempt at rigorous methods would savor more of pedantry than of practical utility. When the sun rises, he has between him and us a considerable amount of sensible and insensible vapors and mists which have accumulated during the night, and which, in more or less time, his rays dissipate. In the afternoon, as he nears the horizon, these vapors again form themselves and so continue until the dew point is reached. Now these mists and vapors, not only by reason of their density but also by their coloring, deprive the sun's rays of much of their actinic property. Of course there is no hard and fast altitude of six degrees when these mists begin and cease. They are really present in some degree during the whole of the day, but the altitude of about six degrees of sun may be taken, below which they exist in such quantity, and in day to day in such varying quantity, that it would be folly to attempt to rule for them: and it has been concluded, in this work, to leave the matter wholly to judgment for those who essay such conditions.

The radius of the earth may be taken at about 4,000 miles, and certainly that portion of the atmosphere over a height of 40 miles can offer no appreciable resistance to the sun's rays. From this data, the sun being six degrees or over in altitude, we may without appreciable error consider the strata of atmosphere as level—that is to say, for our investigation, we need not consider the rotundity of the earth. It is true, computation will show that when the sun is about six degrees high the error will be about 1/5; but as the sun ascends this

rapidly vanishes.

We shall proceed upon the assumption of a level atmosphere, and the further assumption that the condition of the atmosphere remains the same during the day, this latter assumption to be hereafter examined. It may be remarked, in passing, that the fact that the atmosphere exists in different strata, the denser and more

non-actinic near the bottom, will make no difference in our investigation, for the reason that whether the rays of the sun come obliquely or perpendicularly, they all encounter in proportion the same strata.

Now under the foregoing, it can be mathematically shown that the light coming to us, so far as the resistance of the atmosphere is concerned, is in exact proportion to the sun's vertical height, or, more properly,

to the natural sine of his altitude.

To some this might seem obvious. It is not necessarily obvious, but can be made so by the following: It is plain that he amount of atmosphere through which the sun's rays must pierce is directly as the natural secant of the angle of the zenith with the sun's position. But this is inversely as the natural sine of its complement, i. e., the angle of the sun's altitude above the horizon. Again: the amount of light coming to us is inversely as the atmosphere pierced. Consequently, the light coming to us is directly as the natural sine of of the sun's altitude, which was to be shown. We must now go back and examine our assumption that the condition of the atmosphere remains the same during the day, in order to see if it is necessary to modify our conclusion. It has already been pointed out that such is not the case, but instead, in normal conditions, mists and vapors gather as the sun is distant from the meridian, until he is below about six degrees, when their effects are so great as not to be satisfactorily reckoned with. Now, while this cause tends to accelerate the actinic diminution of light beyond our deduction above, there is another natural cause which tends, on the other hand, to conserve the light. There is a very large amount of light which comes to us from its immense diffusion in the sky. While this diminishes as the sun sinks from the meridian, it does not diminish nearly so rapidly as does the direct light from the sun. From the best examination the writer has been able to give the subject, these two opposing causes about balance each other; thus leaving the conclusion above about as stated. Upon this conclusion the foregoing tables have been computed, and the data further used was that, having the sun at an altitude of sixty degrees, an average scene, the fastest plates, and stops f/8 or U. S. 4, the proper exposure would be 1/100 of a second. The natural sine of 60° is .86603. Now if this be developed into a series by halving, and if between the members be introduced a series of arithmetric means, we will have the double series:

.10825 .16238 .21651 .32476 .43302 .64952 .86603, corresponding in development to the exposure series: 1/12 1/16 1/25 1/33 1/50 1/67 1/100

It will thus be seen, as has already been stated, that in the framing of the tables it was necessary to astronomically compute for the different latitudes the different declinations of the sun, and the different parts of the days, intervals, when the altitudes of the sun matched the conditions given. The computations were made by the following method: When the declination of the sun was south, the degrees of latitude were added to those of the declination. The natural cosine of this sum was taken, and from it was subtracted the given natural sine of the sun's altitude. The logarithm of the remainder, treated as a whole number, was then gotten, and from it was subtracted the sum of the logarithmic cosines of the latitude and declination. The remainder gave the logarithm of the sun's distance from the meridian, which was converted into solar time of day by the use of Table XXIII of Bowditch's Navigator.

When the declination of the sun was north, instead, in the first instance, of using the natural cosine of the sum of the latitude and declination, the difference was used, the remaining process being the same as above.

In this way, all of the intervals of the tables were separately computed, excepting that where it was safe to do so, some were introduced by interpolation. Finally, these intervals were corrected, by means of the equation of time, to local mean time.

GASTON M. ALVES.

Potes

Apropos of the visit of Mr. and Mrs H. Snowden Ward, mentioned in our last number, the editor of *Photography* makes the subjoined note concerning a new book by Mr. and Mrs. Ward, which will interest our readers.

"Never was the interest in Dickens and Dickens" land keener than now; and never, we feel sure, would a more hearty greeting be given than to-day to the beautiful volume, 'The Real Dickens Land,' which Mr. Snowden Ward and his gifted wife have just produced. Dickens, of all writers, had a most extraordinary sentiment of locality. While most are content to house their characters in the most conventional of edifices and to depict the life of a district or county, Dickens fits his scenery to his characters with a most marvelous propriety; and, more than that, goes in most cases,—possibly, did we but know it, in every case,—to an actual street and to a real house. The result is that over and over again one can go to an existing building and find the very rooms in which his incidents occur, and find, moreover, that they fit the scene in a way that can be done by no other locality whatever. Mr. and Mrs. Ward selected as many as they could of these places, photographed them, and in the handsome volume just published by Chapman and Hall, Ltd., London (10s. net), have reproduced them with a running narrative of the novelist's life. The 'England of Dickens' is fast disappearing. Many even of the localities illustrated in the book have since been altered out of all recognition, and the work has appeared in the nick of time. We are glad it has been done, and glad it is done by Mr. and Mrs. Ward, beause it is well done. The book, we are sure, will have a wide popularity and a welldeserved one both here and in the United States. If

we might add one more wish, it would be that some day in the near future the same authors would give us a further selection from their well-filled negative boxes, which they tell us are by no means exhausted."

.4

I recently made the discovery, says M. P., in the *Photo Beacon*, that my roller-blind shutter had developed a number of very minute holes, quite sufficient to fog an ordinary plate in a very short space of time. As, perhaps, many may find themselves in the same predicament on making this discovery, I send you herewith my remedy, which, although simple, is thoroughly effective.

In half an ounce of ether or chloroform, stir up a few drops of asphaltum varnish, such as is used for making black rings around covers to microscopic slides. Then cut up very finely a piece of ordinary bottle rubber about the size of a large cherry-stone; slightly larger will do, but do not make the solution really thick. Leave it for several hours until all is dissolved. A shake occasionally will help it. For use, dip an ordinary camel's-hair brush into the bottle and quickly lay a coat of it upon the shutter blind. Let the front portion thoroughly dry before rolling the blind, and then do the other portion. In this way the whole blind may receive an entirely new coat—or several if necessary—and be made perfectly light-tight once more.

4

We are glad to call the attention of our readers to an unusually valuable work now in preparation at Berlin—a technical dictionary which should be most helpful

to readers of photographic literature.

In the beginning of 1901 the Society of German Engineers (Verein Deutscher Ingenieure) began the compilation of a universal technical dictionary in the three languages, English, German, and French. This undertaking has met with general approval and has received assistance from all quarters at home and abroad. Societies and individuals have responded generously to the invitation to collaborate and have proved their in-

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terest by the transmission of collections of technical words made by them or by promising such in the near future.

At present there are 341 societies (42 in English; 272 in German, and 27 in French-speaking countries) coöperating in the work, either by the systematical collection of technical expressions of the specialities represented by them or in other ways, especially by the acquisition of collaborators and by placing technical publications in more than one language at the disposal of the "Verein," as catalogues of firms, inventories, price-lists of machines, handbooks, etc. Through these societies the Technolexicon has found helpers in Great Britain, Germany, France, the United States, Austria, South Africa, India, Australia, Belgium, Canada, etc.

As the contributions will not be called in before December, 1904, all who wish to help in the compilation of the Technolexicon have still time and opportunity to assist in the preparation of their specialities. Contributions from all technical branches (including the handicrafts) are welcome, and it is obvious that small contributions from a host of various collaborators will be more useful than large ones compiled by a few men, who naturally cannot cover so many specialities. tention is to be drawn to the fact that contributions in only one language are also most acceptable, though of course those in two or three languages are the most valuable, as also polyglot business-catalogues and other technical publications. Delayed contributions, if they arrive before the end of 1906, when we shall begin to print, can still be made use of.

The editor-in-chief will be pleased to give any information wanted. Address: Technolexicon, Dr. Hubert

Jansen, Berlin (NW. 7), Dorotheenstr. 49.

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The last date for sending in entries to the Eastman £1,000 Photographic Competition has been postponed until June 30, this date applying to the arrival of the exhibits in London. The date for the closing of American entries can be learned by application to the Eastman Kodak Company, Rochester, N. Y. The exten-

sion of time here given will doubtless be a great convenience to American competitors, as giving better opportunity to secure desirable subjects.

4

Sir Benjamin Stone, who represents East Birmingham in the English Parliament, is well known as an enthusiast in record photography—the preservation, by means of photography, of historical subjects which are passing away. In this work Sir Benjamin Stone has accumulated the largest collection of the kind in exist-According to a note in one of the London papers, Sir Benjamin recently went to the expense and trouble of a mock funeral in order to record certain historical details connected therewith. This extraordinary affair took place in the graveyard attached to St. Nicholas' Church, Aberdeen, Scotland, Sir Benjamin Stone and another member of Parliament taking part in the event. The funeral procession in this part of Scotland is unique. The members of the Shore Porters' Society, wearing their long-tailed coats and broad bonnets with red tassels, solemnly bore the casket to the grave-side. With the respect for the dead common in Scotland, the casual observers present bared their heads, but when Sir Benjamin Stone appeared with the camera and proceeded to photograph the procession, it leaked out that it was only a mock funeral, to enable the member for East Birmingham to include the scene in a series of prints illustrative of Scottish life and customs.

A

The Eleventh Annual Exhibition of the London Photographic Salon closed a few days ago. It was spoken of by the English press as quite equal to its predecessors both in the number and quality of the prints exhibited, although bringing forward nothing remarkable. For some reason which does not appear, many prominent American workers, among them Mrs. Käsebier, Clarence H. White, F. Holland Day, Alfred Stieglitz and E. J. Steichen, did not exhibit this year. Among the American workers who did exhibit, the prints sent by Alvin Langdon Coburn attracted much

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favorable comment. We are inclined to agree with the reviewer in the British Journal of Photography where he says of Mr. Coburn's work, "It shows that he is possessed of imagination and is not afraid of giving it full swing. With a better appreciation of the limitations of his medium and greater mastery of it, he should attain a high position among pictorial photographers. His portrait of Mrs. Käsebier is admirable, and in the Portrait of My Grandmother' he has produced a picture which, though hardly pleasing at first glance, fully justifies itself on better acquaintance." This will interest admirers of "The Edge of the Forest," reproduced on another page of this issue.

4

In an article dealing with exposure shutters, contributed to a German exchange by Dr. Kaiserling, of Berlin, the writer says that for stand-cameras he has not met with a cheaper, more durable, simpler and more generally useful exposure shutter than the Thornton-Pickard. This is interesting as evidence that in spite of the widespread imitation of the Thornton-Pickard shutter both in Great Britain and Germany, Dr. Kaiserling prefers the original article. Referring to focal plane shutters, he recommends the photographer not to use them for plates larger than 31/4 x 41/4, on the ground that the shutter will not be found quick enough for larger plates. This advice reads strangely in view of the fact that American manufacturers do not list focal plane shutters for plates smaller than 5 x 7. Coupled with this is the recommendation not to photograph the object too large in proportion to the size of the plate. Dr. Kaiserling withholds his judgment concerning the adjustment of the slit, as to whether it should be adjusted from the inside or outside. He is experimenting with shutters of both kinds made by Anschutz, and promises his opinion in a later article.

Postscript to No. 27 The Photo-Miniature

Under this heading will be published occasional postscripts to earlier monographs in The Photo-Miniature series, giving new or additional information.—[EDITOR]

MODIFICATION OF THOMPSON'S TABLES AND METHOD OF CALCULATING NEEDLE-HOLE EXPOSURES

By JULIUS MARTIN

TIME

A.M.	Hour	ъ.м.	June	May July	April August	March Sept.	Feb. Oct.	Jan. Nov.	Dec.
11	to	1	1	1	1	1.3	2	3.3	4
10	or	2	1	1	1.3	1.6	3 · 3	4	5.3
9	or	3	1	1	1.6	2	4	10	20
8	or	4	1.3	1.3	2	3.3	8		
7	or	5	2	2.6	3.3	5.3			
6	or	6	2.6	3.3	5.3				
5	or	7	4	5.3					

SUBJECTS

Distant view; no near foreground: Beach and river scenes, well lighted.	Near view with long distance: Light objects near: Field and road well lighted.	Near view, with foliageorshadows in foreground: Street scenes and portraits out-of- doors.	lighted with clear glass windows: Glades under
3	6	I 2	120

PLATES (Cramer)

Anchor	Banner	Crown	Inst. Iso.	Med. Iso.	Slow Iso.
2.5	1.3	1	1.5	2	10

LIGHT

	Sun	Sky			
Clear	Slightly veiled, sky clear	Clouded, air clear	Gloomy		
1	1.5	2	4-8		

NEEDLE-HOLE APERTURE

No. 8	No. 10	No. 11	No. 12
.5	I	1.5	2

PLATE DISTANCE

4 in. 5 in.		
	4 in.	5 in.
1.5	I	1.5

ILLUSTRATION

Time, June, 2 P. M.; subject, near view with long distance; plate, Banner; light, sky clouded, air clear; aperture, No. 11; plate distance, 4 in. (75°).

From the tables given we select the values of the constants in large black figures as follows: Time, 1; subject, 6; plate,

1.3; light, 2; aperture, 1.5; plate distance, 1.
The combined product of these factors is 23.4, which is the time in seconds for the exposure. If the factor for the Banner plate were 1.5 instead of 1.3, the product would be 27 seconds, the value given for the time of exposure by Thompson for similar conditions. These multiplications can ordinarily be done in one's head without recourse to pencil and paper.

SECOND ILLUSTRATION

											F	actors
Time, August, 10 A. M		٠								٠		1.3
Subject, Portrait out-of-doors		٠										12
Plate, Crown												I
Light, Sun slightly veiled, air	cl	ea	r									1.5
Aperture, No. 8												.5
Plate distance, 5 in												1.5
The combined product is 18,	as	2	iv	en	b	v í	Γ l	or	no	30	n.	,

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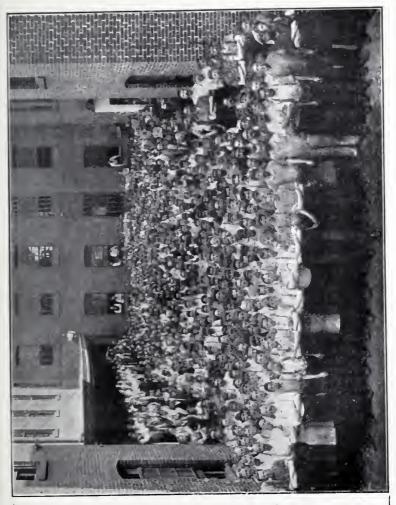
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Once upon a time there was a foolish hunter, who said unto himself, "I will buy me a rifle that shall forthwith cause envy from all my neighbors." And straightway he sat him down and wrote for divers catalogues, and he went forth into the city and inspected the firearms that were there offered for sale. And after much thought he bought, with many broad pieces of silver, a beautiful weapon after the most modern and improved design.

Forsooth," said he, "I have expended much silver for this beautiful weapon, and it behooves me to economize in the pur-

chase of the cartridges to be used therein."

Now, it so happened that the maker of this beautiful weapon also made for it cartridges of special design and fitness, with powder of high power that made no smoke, and it so happened also that the weapon was chambered in such manner as to make for these cartridges an exact fit. But these cartridges being of the finest quality and of great strength and exactness, the maker asked for them somewhat more silver than was asked for other cartridges.

Yet it so happened also that the young man in the marketplace of the firearms, thinking to make a greater profit to himself, said to the foolish hunter: "These cartridges made by the maker of your weapon are most expensive; but here are some that are 'just as good' which I will exchange for a small piece

of silver."

And the foolish hunter bought the "just as good" cartridges and went forth into the forest. And the cartridges not being of perfect fitness, the missiles sped wide of their mark, and the hunter slew no game.

"Forsooth," said he, "the weapon has cost me much silver, but of what value is it, since it will slay no deer?" And straightway the foolish hunter took the weapon, and with great anger

flung it into a bottomless pool.

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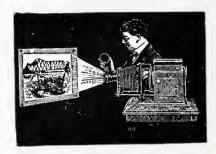
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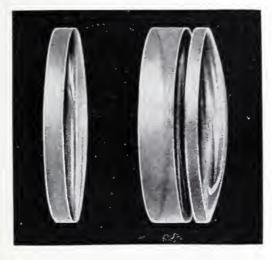
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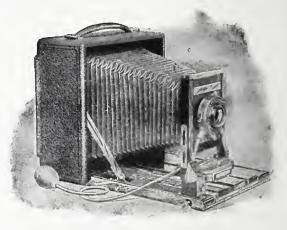
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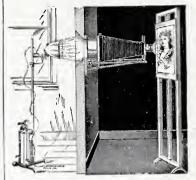
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From a photograph by F. C. Lambert

The Photo-Miniature

A Magazine of Photographic Information EDITED BY JOHN A. TENNANT

Volume V

AUGUST, 1903

Number 53

PICTORIAL PRINCIPLES

In the forefront of this little book on Pictorial Princibles I desire to set forth two pregnant sentences from the editorial preface of No. 25 of this series, and entitled Landscape Photography, to wit: "There are many books on landscape photography, but it is an inexhaustible theme and we cannot know too much about it." 'There is, of course, no finality in this or any other phase of art." Here we have abundant justification for the making of this and many other books on the subject. Moreover, if one may rightly judge from the average photograph, there is indeed need for more knowledge, and that knowledge more widely spread. Nor can we ever hope to reach finality. As the mountain climber extends his horizon with every upward step, so the student in this and every other realm of knowledge, with every addition to his store of information only learns how much there is yet left unknown.

In putting together these notes, as an addition to what has gone before in this series, it is my purpose to approach the subject on somewhat broader lines than those usually followed by writers on the subject of

pictorial photography.

Some writers on photographic chemistry would lead us to think that there is a subtle difference between the chemical changes in photographic manipulation and all other chemical or physical problems. But a moment's thought will tell us that the same underlying principles are common to all matter, whether in the hands of the photographer, manufacturer, agriculturist, analyst, etc. Similarly we may, if we will, trace the same fundamen-

tal principles underlying all the arts, e. g., poetry, music, drama, painting, sculpture,—though, of course, now one and now another principle finds prominence according as the artist works in this or that medium of expression. It is well to remember the old-world saying, "the sister arts." It reminds us of a common parentage, a common bond among them all. And as in the average family of sisters we may often trace a strong resemblance between certain members, so among the sister arts we naturally find a close resemblance between the pictorial arts of drawing, painting, engraving and the younger sister Photography—a veritable Cinderella. Who knows but what this "little one" may in the future find her foot fitting the glass slipper and carry off the prince, away from her older and somewhat jealous sisters!

It was my good fortune to be a painter The Painters' years before I was beguiled into forsak-Viewpoint ing the brush for the camera. This early training at the easel has given me a somewhat wider aspect than sometimes falls to the lot of the camera worker. And a fairly close acquaintance with the great works of the masters has instilled a respect for what these giants have produced,—a respect which many photographers might with advantage to themselves seek to cultivate. The reader will, therefore, bear in mind that what is here written is deliberately intended to invite photographers to view the subject of pictorial composition from such a point as will at the same time include drawing, painting, etching, engraving, etc., as well as photography.

Principles vs. Rules

Rules

There is a general misconception among photographers about the terms: rules or laws of composition. The words rule and law are somewhat unfortunate, as commonly signifying something that must be done or a penalty incurred. But consider for a moment what the grammarian means by the rule of syntax, for instance. Is it not merely an abbreviated way of saying, "I observe that eloquent and expressive writers or speakers usually arrange their words and sentences in accordance with certain forms, or in certain sequences or groups. They do this because that arrangement best

conveys their meaning. At the same time, when special efforts are required, they abandon the customary forms, and their result justifies the means." Similarly the student of the universal language, pictorial art, observes that picture-makers usually arrange lines, forms, light and shade, and such like things, in certain ways. But for special effects they may depart from them. Hence he deduces the rule, -in other words, the usual procedure. But at the same time he bears in mind that variations or exceptions may and do occur. Further, he observes that the very fact of the majority of cases being dealt with in a certain way gives an added value to the exceptional treatment, when it has been used with knowledge and skill. But the ignorant person, observing the force of the exceptional method, attempts to get force by imitating. Alas! he uses it without knowledge and obtains not force, but extreme feebleness. The skilful physician, with knowledge, uses a powerful drug with health-giving results. The ignorant quack's experiments end fatally. Hence we photographers must not be content with reading books of rules of composition. We must get below the surface and understand why, and when, and how, we should use them or depart from them. Rules without a knowledge of the underlying principles are of little use. But a knowledge of the principles enables us to infer the rules for ourselves. Rules are easily forgotten or misunderstood. Principles understood are remembered and become a part of one's self. Half-a-dozen principles clearly understood are infinitely better than a hundred rules. Then, again, a few principles rightly grasped give us a set of new senses. We are constantly finding exemplifications, not only in our pictures, but in other arts. Let us take a very simple example;

An Example viz., the contrast of light and shade.

Perhaps the reader remembers, let us say, an etching of Rembrandt,—a dark interior, with a slanting beam of strong light falling upon a figure in shadow. The effect, at once striking and effective, appealed to the imagination and so was remembered. But that is only one of a score of instances showing how contrast adds strength. The strong light looks all the

brighter and the dark shadows darker because they are close together. This is equally true of contrast of form, straight and curved lines. Every sculptor knows how some object with shaped lines, e. g., a sword, spear, rock, etc., gives force to the subtle curves of the human figure. The contrast of large and small masses, of angles and flexures, of rigid or relaxed pose, of color, and half-a-dozen other ways occur in our pictures. But contrast does not end here. The dramatist's most powerful weapons of tragedy and comedy, of virtue and vice, etc., abound in every great work. The musician's contrasts of harmony and discord, loud and soft, quick and slow, solo and chorus, symphony and melody, need only to be mentioned to be at once realized.

Thus the thought once started, all the world seems full of contrasts, each part of the contrasting piece adding something to the other and giving us the very opposite of monotony. What is true of one principle is true of others. They are of universal application, though of course not of equally frequent occurrence.

Let principles rather than rules be our study.

The making of pictures. What is Our behind that? If we bear in mind that Aim? pictures are the universal language of mankind, our answer is not far to seek. Language is The man who used to convey thought, to tell a story. pretends to make pictures and has nothing to say is as much a nuisance as the bore or the babbling idiot who "talks for talking's sake." Happily there are but few people who can look at beautiful things without, possibly unconsciously, admiring them, being interested, impressed and influenced by them. It is an all but universal impulse to say to others something about the things we admire. Thus the pictorially disposed desire to convey to others something of their thoughts. It may be the beauty of form, the curving of the ocean wave, the branches of the forest tree, the rolling forms of cloud and mountain mist, the sparkle of light and shade in the glen, the leaping, laughing water of the brook, the dimpling smile in the face of a child, the sorrow of age, the bustle of the quay, the stillness of the woods, or a thousand other things. But be it what it may, it is something which has touched "a thought within which is too deep for words," yet calls for telling. The picture-maker's aim is to speak without words, to bring others to see with him "eye to eye." We want to speak with silence, to show others what has appealed to us. Hence arises the need of selection.

Selecting is therefore our starting Selection point, for it is seldom that the various parts of the scene before us appeal with equal force. Nearly always certain parts, factors or features stand out and grip our hearts, while others are scarcely noticed. Here comes the photographer's first stumbling-block. His negative includes a dozen unnecessary features that he "never noticed." The dream is shattered, the picture he saw has vanished. What he saw when looking at the scene is almost obscured by the dozens of things that he did not see, though they were there all the time. Here steps in the painter or sketcher. His first lesson is learning to leave out what is not required. When furnishing a room you do not go to a furniture dealer and buy haphazard the first score of things you find in the store. You select what you want and leave what you do not want. Then, when you get your furniture in your own room, you set to work to arrange it so that each item may be in an appropriate and effective position.

Before Composition or arrangement. Composition strictly means bringing things together, as a builder brings together the various woods, stone, and other parts of a building. In this way the draftsman, more than the photographer, composes, for the former can alter the relative positions selected; moreover, he can transfer objects from one scene to another. The photographer is somewhat limited in this direction. For the most part, it is a matter of selecting from what is already there and then arranging the parts selected. Selection in photography is largely a matter of leaving out; composition is largely a matter of arranging the apparent relative positions of the parts so selected.

The photographer also can alter his point of view by moving to the right or left, raising or lowering the cam-

era, advancing toward or retreating from the objects. He has also the choice of a long- or short-focus lens, sharp or diffused definition, and so on. Still, for the most part, these are modifications, rearrangements, rather than additions or subtractions, such as the sketcher can employ. On the one hand, then, we have certain powers, although these powers are somewhat different from those of the sketcher. Ignoring these matters leads the painter into judging photographers from a wrong standpoint, and also leads photographers to attempt the im-

possible or neglect the possible.

We have first of all to consider, in Pictorial. selecting our subject, what aim, what Purposes object have we in mind? Let us here assume that we are ignoring scientific or record work. and that the answer is: The making of a picture. What, then, is the object of a picture? Many would say: To give pleasure. But we have pictures which give pain rather than pleasure, e. g., a powerfully rendered battle picture, fire, death-bed or other scenes wherein sorrow rather than pleasure is the keynote. Many dramatic works, e. g., tragedies, poetry and music, move us to tears rather than laughter. For our answer we must go deeper, and say the object of a work of art is to appeal to the imagination. This separates it from scientific or record work, which appeals to memory or observation. This explains why so many photographic pictures are not pictures at all. They are merely dry-as-dust records of facts, without any appeal to the imagination. It may be said: "But they are true to nature, and nature is always beautiful." On the contrary, nature is often hideous, ugly, repulsive; and, again, the statement "true to nature" only means that they record facts which may be found in nature, but these facts may not constitute the whole truth nor even the more important part. For the fact, is, that truth depends largely upon the point of view. A thing may be true in fact but false in impression, and yet it is often the impression which is most important to us in daily life, and always in art work. In everything we see we are unconsciously influenced by all earlier impressions of similar things.

What, then, are the factors which Imagination stimulate imagination? Briefly,-memory, association, mystery. Suppose a person blind from birth to have sight given him, and the first object shown him, let us say, a landscape painting. It would convey little or no meaning, because he would have no memory of having previously seen any similar thing. A picture appeals to us because we have seen other trees, other lakes, hills, clouds. The picture revives certain sensations. But that is not enough. The objects seen in the picture recall certain associations,—the glow of sunset, the swaying trees in the wind, the nodding corn-fields, the angry shore-beating wave. And yet these are not enough. These are revivals of old sensations. We want something further still. Memory and association start a train of thought, but in order for this train to go on, and on, and on, it must have room to move. The picture, the novel, the poem, the drama, must not be a dry and complete catalogue of facts or fancies. It must leave something unsaid. We must have room to wonder, to think, to imagine, to build our own castles in the air, to weave romances, and "fight old battles o'er again." Hence is it that the deadly sharp-all-over photograph or steelengraving is about as poetic or artistic as a railway time-table or an architect's working plan. The thing is all hard, dry fact, dull and lifeless. It is just here that so many photographs fail as pictures. We may admire their skilful technique, but they do not touch our feeling. They may appeal to the head, but they certainly do not appeal to the heart.

The Basis of Truth work shall be true in substance: Thus, a landscape taken with shadows falling to our right, i. e., with sun somewhat to our left, combined with a printed-in sky suggesting no sunshine, or the sun on our right, will be untrue in substance. It will lack what painters prize so highly; viz., unity of effect. Now, in photography, we may take the landscape at one place and the clouds a week later or many miles away, and combine them. The purist objects to this as being untrue, yet the result, if artfully done, will

more closely reproduce the illusion of nature than the average result showing landscape and clouds on one plate. His result may be true in circumstance, but it is a hundred to one that it is false in tone, in the relation of light and shade, simply because the sensitiveness of the dry plate is not the same as that of the eye under normal conditions. Would - be impressionistic photographers are often apparently quite oblivious to the importance of aiming at a foundation of truth. It is also a common error to suppose that impressionism and realism are "as the poles, asunder." For, in fact, impressionism is simply realism with selection. But socalled realism is often an indiscriminative record of facts, without any sense of their relative importance or value. Again, the man who wants a cheap laugh defines any attempt at impressionism as a fuzzygraph, an out-of-focus effect. He might just as well say that poetry is the same thing as bad writing, merely because some few poets have been illegible writers.

Personally, I have no axe to grind, no The Via "song to sing." I would gladly do Media away with all such terms as impressionistic, realistic, etc., as useless labels. I get as much pleasure from one style of work as from another. All I ask is that it shall be good of its kind. I would here counsel the young reader to avoid attaching himself to any school, or style, or mannerism, to avoid consciously imitating any one's subjects or methods, and would, with Polonius, say, "To thine own self be true." Do not try to make your photographic prints resemble engravings or pretend to be anything that they are not. Of course, sometimes they do very closely resemble engravings or charcoal drawings. Well and good. That is more or less accidental and is neither a virtue nor a vice. As Ruskin has properly pointed out, each art and method has its own defects, limitations, excellencies. childish to try and make ours simulate another, or pretend to be what it is not. The reader who has had patience to go with me so far has already been saying to himself: "If we spend so much time laying the cloth, there will be no time left for the meal." Nevertheless, I would urge that the foregoing is the bed-rock





PLATE B

of the matter, and if we are not careful to lay our cloth in a safe place, the dishes we place upon it may be upset and our dinner lost. Let us apply what has been said.

A work of art is an appeal to the imagination by means of the powers of memory and association, with room left for expansion. This must be based on truth; not necessarily all the truth, but the essential, selected portions which affect us.

Unity

This brings us to the first principle of unity, fitness or consistency, for writers and thinkers upon these matters have

given various names to the same root idea.

This principle tells us that all the parts of pictures should belong to each other, and not only that but that the artist has selected them all because each part has something of value to add to the whole. On a ship we have captain, mate, cabin-boy, and the rest of them, each with his own work to do None are there by accident; each contributes his own part to the wellbeing of the whole. If any were absent or did not perform his work properly, all the others would in some way or degree suffer. The same is true with any work of art. It is an organic whole, like the human body of many parts performing various functions, yet one thing, not many.

We often see disregard of this principle, with fatal consequences, in a good deal of professional portraiture where a certain number of painted backgrounds and sham accessories are used for all the sitters. These backgrounds and properties are often obviously quite un-

suited to the face and costume of the sitter.

Mention has already been made with regard to the use of skies and clouds which do not harmonize with the lighting of the landscape. But the direction of lighting may be true enough, yet the character of the whole be out of harmony. Thus you may have a picture of angry waves and rugged rocks with a calm and smiling sky, and so on.

Again, the figures and animals of a landscape subject may be inappropriate to the surroundings. For example, a passing show may give us an elephant calmly walking down an English or American street. The snap-shot amateur says: "But I took it just as it was, so it must be all right." Yet he would not go to the portrait painter to be "took" just as he was, if he happened to have a swelled cheek, a scratch on his nose

or a black eye.

The camerist who takes his best girl in her newest hat for an afternoon in the country lanes is not likely to get unity of effect by posing her, let us say, on a broken fence or in a rough cottage interior. Similarly, a tall hat and frock-coat do not add charm to the farmyard scene. Need one multiply examples of the incongruous that tend to destroy unity of effect, consistency between the figures and their surroundings, harmony of part with part? But consistency is not enough. A certain part may be consistent enough. Thus, pigs, cows and horses may be consistently together in the farmyard or field. The question is, Do we want them all there; do we want them at all? Would not the picture tell its tale, make its appeal, without several, most, all, of them?

One may be well within the truth The Allwhen saying that two out of every three inclusive photographs suffer from containing too Photograph much subject-matter. They show too many facts,-true enough, consistent enough, maybe, but not helpful facts. Not only are they useless, but positively harmful, because these many objects of no interest tend to distract the attention of the spectator. In walking along the street you pass a shop-window with a hundred articles displayed. At a glance you get an idea of furniture, clothes, grocery, etc., but a moment after, if suddenly asked: "What did you see?" you might hesitate in naming definitely and positively any one thing. A moment later you pass another shopwindow containing only some two or three objects. These you see and remember. Probably they arrest your attention and you pause, for these one or two objects tastefully displayed against a suitably quiet background make a far sharper and deeper mental impression than the countless contents of a crowded shop

front. The same thing applies to a walk around any ordinary photographic exhibition. Nineteen out of the twenty frames fail to arrest attention, despite the excellent or even faultless technique displayed. Each picture contains so much that its message is obscured. It is like a crowd of people shouting together, all saying something different. We hear only sound, but no definite ideas come to us. Compare this with the voice of a single speaker. The same thing is true of the play with too many trival incidents or superfluous characters. It is similarly true of many paintings, - too many notes of color, so that none stand out strongly.

Truly may one again say that the art of composition is largely the art of leaving out rather than bringing in.

The principle of simplicity in selec-Simplicity tion, in arrangement, in lighting, mounting and framing is one of great importance to the photographer who aims at doing strong, rather than "pretty" work. Let us assume that we

have selected our subject, and selected only such parts or elements as we feel are likely to help the telling of our message, that we feel they properly belong to each other and to their surroundings. In a word, we have had an eye to simplicity and to unity or harmony of The next question is this, How shall we parts.

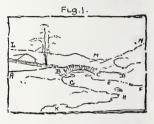
arrange the parts?

Here our subject at once naturally falls Chiaro-oscuro into two divisions; viz., arrangement of form, shape and size, and arrangement of light and shade. Now, although the two are indissolubly connected in nature, just as color is associated with them both, it will materially help us along in our studies if we at first deal with only one of them at a time. It is easy to assign effects to wrong causes—thus light and shade affect form considerably, so that were we to attempt to deal with both at the same time confusion rather than edification would be the more likely result in the reader's mind.

If we study an approved example of Leading pictorial composition we shall see that Lines the eye instinctively follows certain lines. straight or curved, sharply defined or only vaguely suggested. If we pass to any natural scene the same thing may be observed in varying degrees of insistence.

Let us take Plate A as an example. Here we have a quite ordinary photograph of a bit of lakeland scenery. In Fig. 1 we have roughly made a rapid analysis of the

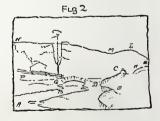
"leading lines." The spectator's eye will probably enter the scene at A, pass on to B and then over the old Roman bridge B C and on to D. Here the interest ceases. The eye returns to C and follows along the river edge E and to F, or it may return to B and



pass along the nearer bank GHK. The eye will instinctively feel the balance of the direction again when passing from L to M and M to N. Similarly, we get alternating direction or balance at GH and HK. The upright tendency of the tree is an agreeable contrast with the general horizontal tendency of most of the other leading lines of the scene.

Turn now for a moment to Plate B and Fig. 2, which show us the same scene, the materials being differently arranged, i. e., viewed from a different standpoint, some few yards only away from the first position, Fig.

2. In this case probably the eye will be first attracted by one or other of the river-bank lines, and travel from A to B. At this point our interest may pass along and over the bridge in the direction of D to P, or, more probably, the eye will be attracted by the very in-



teresting line of the old wall, C D E F. The eye going down will return along F E C and on to H and K, and then will follow the sky-line K L M N. As soon as the student catches this idea of analyzing a composition and

examining the leading lines, he will at once see how important these lines are, how they practically control the decorative effect,—how they convey various thoughts, sentiments, suggest motion, rest, etc.

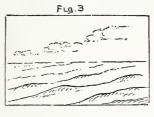
The Meaning of Lines

The Lines

Meaning of Lines

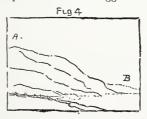
The Meaning of

there is a tendency for the lines to cross each other, or run in somewhat opposite directions. To quote an



obvious instance, the waves of the sea, Fig. 3, following each other in a series of more or less parallel lines. What is the result? First, monotony, lack of interest, due to absence of variety of direction; next the picture feels lop-

sided, lacking stability, balance, with a corresponding suggestion of motion. Fig. 4 is another analysis of a bit of country scenery showing a streamlet. The same lop-sided effect is suggested. The land seems to be slid-



ing down in the direction of A to B. A lot of trees leaning all one way suggest that they are either falling over or are influenced by wind. Similarly, boats tilted one way suggest sloping land and sliding motion; or a row of sloping parallel lines.

so—////—suggest that they are toppling over to the right. But the introduction of even one in the opposite direction, thus, ///\seems to suggest support. We may thus learn that balance is not so much a matter of quantity as quality. Indeed, a composition consisting of anything like an equal number of leading lines in each direction becomes too geometrical or symmetrical and characterless.

Balance by Line

Thus, in Fig. 1 we see balance of direction in B H and H K. Again, in A B and B C. Again in L M and M N. Similarly, in Fig. 2 we get the fence and the roadway at P Q, forming an agreeable contrast of direction. Similarly, the various twists and turns in the old wall C D E F give an effect of balance. Again, the bit of wall H K balances the sky-line K L, while L M counteracts N M, and so on.

This matter of balance of line is a far more subtle thing than some writers about photography would have us think. We have only to study Japanese art of the best kind to see how deeply it enters into the strange fasci-

nation of these workers.

The reader must be on the watch for examples in natural forms, e. g., the two sides of an irregular leaf, or feather, or shell, the branches of a tree, and so on. A well-balanced thing gives us the root notion of permanency and completeness. All ill-balanced designs suggest incompetency, or that the work is left in an unfinished condition.

Symmetry, of course, is abundantly found in nature. But we may surmise that its aim is use rather than beauty, e. g., two eyes, two ears, two hands, etc. Symmetry means balance without variety, is monotonous, and often useful. Balance, on the other hand, is often useful also (e. g., the front and hind limbs, differently shaped and

sized fingers), and the variety extends the usefulness.

This is sometimes called "connection

Radiation of parts," "center of origin," etc. Here again we have another deeplying principle, founded, as all true principles are, on natural laws and phenomena. Look at a tuft of grass; note how all the blades come out of the earth fairly close together, but soon spread out in different directions.

The convergence toward each other suggests a common origin or parent root, though we do not see it.

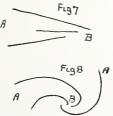
Again, look at a feather, Fig. 5, and note how the general tendency is for the little plumules to lead us

down toward the quill; or again, look at a leaf, Fig. 6, and see how the veinings all seem to A point their origin to one portion. i. e., where the leaf is inserted on its leaf-stalk.

Turn now to Fig. 7 or Fig. 8, and note how the eye more naturally goes from A toward B and then from B to A, i. e., the eye is unconsciously led to the point or direction of convergence. We may observe

this in countless natural objects.

FIG. 9



Take the case of a tree whose branches I roughly sketch from my window as I pen these lines, Fig. Q.

In this case the lines are somewhat straight and cross each other, yet on the whole the eye is led to-

ward the trunk and root.

In Fig. 10, a crude sketch of a human ear tells us the same thing. But here the converging curves are more subtly arranged. I take my handkerchief, Fig. 11, and, holding up by one corner, sketch



FIG. 10

its folds. The same story is told: the folds lead the eye from A to B. This radiation principle is seen in drapery, rigging, nets, shorelines, etc.

What is the moral of

the matter? Simply this: When selecting your viewpoint, bear in mind the fact that converging lines will

lead the spectator's eye toward their point of origin. Do you want that? You may or may not. These converging lines may be the making or marring

of your picture.

In Fig. 12 we have an analysis of a photograph of a bit of English lakeland scenery, where a road runs along the side of a hill. In this instance we note how the leading lines of the hills tend to converge to the point where the roadway passes around the hill and goes out of view. The spectator is thus invited, as it were, to pass along this road and turn the corner beyond.

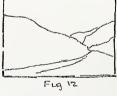
As in the case of balance, so here we may add to or subdue this effect, according to our needs, by altering the viewpoint, printing in suitable clouds, adjusting the defini-

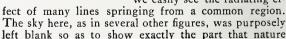
tion, etc. Plates C and D are instructive in this connection. They show the same subject, but with lenses



In Plate C we get an ordinary example of balance of leading lines fairly easy to trace. In Plate D our point of view was a little nearer the bend of the roadway and a lens of greater focal length was used. In this instance we easily see the radiating ef-

FIG. 11





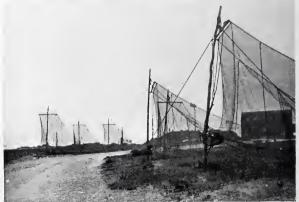




PLATES C and D

From a photograph by F. C. Lambert





PLATES E and F

From a photograph by F. C. Lambert



From a photograph by F. C. Lambert

PLATE G



has provided for us in the way of subject-matter. These two examples show the various effects of change of viewpoint combined with change of view-angle.

It will be noticed that in Plate C our interest is chiefly arrested by the foreground rushes, trees, and so on, while in Plate D the sweeping curve and plain foreground make us curious to know what we might see by going around that corner. This also illustrates the aforesaid observation that the simpler picture often appeals more strongly to the imagination. What is left out is not wasted, for its omission has increased the value of that which has been retained.

Curvature naturally follows as the next topic of consideration. Briefly, one may say that a picture that is all curves or which

has no curves is seldom if ever satisfactory.

The curve gives the quality of grace, softness, beauty, elegance, and often suggests motion. Almost all natural objects are bounded by curved lines or surfaces; straight lines or flat surfaces are very rare. By way of example, we may instance flowers, fruit, leaves, forms of animal life, shells, etc. As examples of flat things, and these are not living forms be it noted, we may instance natural crystals. Painters talk of a living or "vital line." This is difficult to define, but the thoughtful reader will see for himself, if he compares the subtle curvature of a nearly straight tree-stem with his rigidly straight walking-stick.

Curves are of two chief kinds; viz., Difference constant and variable. The circle readily in Curves occurs as an instance of one, for if from the same circle we take any part it is the same in quality as any other part. Hence it is but one stage removed from the monotony of the straight line. If we balance a coin on the finger-tips and look straight down upon it, we see a circular outline. But by raising the finger and coin and viewing it from the side, we get an elliptic outline at once more interesting than the circle, for its different parts vary somewhat in character. But presently, when it is just level with the eye, the ellipse vanishes into a straight line, and our interest vanishes also.

Another uniform curve is the geometrical spiral, Fig. 13. This is of little artistic interest. If, however, we

go to nature we seldom find uniform curves. Take the case of an egg. Although it is symmetrical, it is not so symmetrical as the ellipse and consequently more interesting. We may see this point by a glance at Fig. 14, where we contrast an ellipse with a normal egg-shaped body, represented by the dotted line. But take now the case of a pear, Fig. 15, and note that

we here depart from symmetry and yet have ideal balance with a wider range of interest. For, as we follow the outline around, we find no two parts of exactly the same curvature.

Variable Curves

Variable Curves

Old, old method of comparing it with a straight line. In Fig. 16 we may see a straight line contrasted with two small portions of circles of different radii. Now, although these two curves have different rates of variation from the straight line, the ratios of variation are the same.

But in the case of Fig. 17 we see that the three curves are not only different in character, but that the character of each curve varies as we examine it at different parts. It is this constantly varying nature which gives the curves of natural objects, Figs. 10 and 15, their special interest. This, again, is a practical matter in picture medium.



FIG. 13





FIG. 15

matter in picture-making. For, as we have already seen with our experiment of viewing the contour of a cir-

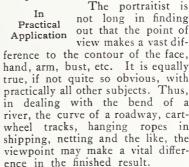
cular coin from different points of view, the nature of a curve may vary considerably according as we change

our point of view.



FIG. 16 FIG. 17

FIG. 18





Graceful-Grace in ness of cur-Curves vature is a very difficult thing to analyze. It seems to be closely associated with two qualities; first, a very slowly, gradually changing ratio of curvature. and secondly, a graceful curve seems in general to be one which varies but little from a straight line: in other words, slight

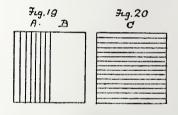
variation of character and not a very great departure from straightness. Thus in Fig. 18 the two curves on the A side of the central straight line are more interesting and also more graceful and more vital than the two portions of cir-

cles on the B side. This brings us naturally to the consideration of contrast of curve with straight line. A few straight lines in a subject of a "curvy" nature are often of great help. They seem by force of curve contrast to pull the composition together, to add strength to what, without them, is very apt to be a somewhat flabby thing, reminiscent of the eternal freehand drawing copy of our schooldays.

When two straight lines meet each Angles other at or anywhere about a right of Lines angle, they convey the feeling of strength and stability. Thus in buildings we find a preponderance of vertical and horizontal lines, giving this suggestion of firmness, fixedness and strength. is absent when lines are meeting at a comparatively small angle, as in Fig. 7 for instance. By way of example, in posing a figure so that he is resting one arm on a table or similar support, if the upper and lower parts of the arm be at or about a right angle the pose suggests great firmness. Similarly, the outline of mountains meeting in this way suggests stability, weight, mass, size, strength.

Figs. 19 and 20 show an instructive experiment in very simple form. Here we have two squares of equal size. In Fig. 19 we divide the square in half. One half, A, we fill with vertical lines, the other is left blank. Note how the half A seems larger than the

blank half, B. We thus learn that a space cut up into small parts looks larger than one not so filled with lines. Again, the space C in Fig. 20 is filled by horizontal lines. Thus the square C looks not square but longer



in the horizontal than the vertical direction, and if we had quite filled A and B (Fig. 19) with vertical lines the difference thus suggested would have been still more marked. Hence we learn that horizontal lines in a composition tend to give us the feeling of horizontal extension; for instance, the parallel waves of the sea, sand-dunes or the ridges of the corn-field. Similarly, the upright lines of the pillars in a cathedral add to its apparent vertical dimensions.



From a photograph by F. C. Lambert

PLATE J

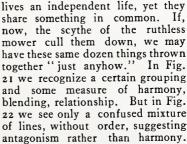


PLATE K

The student will hardly need be told that by changing his viewpoint he may often include or exclude various horizontal or vertical lines and thus contribute

something to the skeleton framework of his composition. (See Plate O.)

Before pass-Grouping ing away from of Lines the consideration of the lines (skeleton) of the picture, one thing must be emphasized, although doubtless it is known to every reader. I mean, of course, the supreme importance of recognizing that the lines of a picture must belong to each They must be harmoniously grouped. To take a very homely and crude instance, in Fig. 21 we have, let us say, a dozen or so springing, blades of grass more or less, from a common Although each blade



Note that in both instances we are dealing with the selfsame things. The difference is only

a matter of arrangement.

Thus, often does the technical photographer complain that his fine work is not recognized by the art juries.



How can altering the position of the tripod make so much difference? What can the detail of point of view or arrangement matter? Yet even he prefers to take his food in some sort of order, and not just "mixed anyhow" without regard to form.

So far we have given attention to the foundation lines in composition. We Arrangement may now pass on to consider arrangeof Parts ment of parts. That is to say, while we are striving to get a graceful arrangement of line, balance and so forth, we must at the same time keep clearly in mind the aim which underlies these desires. Thus the poet, in striving to get flowing lines, musical sentences and picturesque phrases, has yet a more important aim; viz., the forceful expression of a leading thought. Similarly, the playwright has a leading character, a leading story, although there may well be other interesting characters, other subordinate incidents and interests. So the pictorial artist has some theme of principal interest, some thing to which he desires to draw the spectator's attention. This is often referred to as the law of principality.

This simply means that some feature Principality or part of the picture shall unmistakably reveal itself as the object of chief interest, and be in itself an explanation why the picture was made. It is the raison d'être, the motif of the composition; for example, in a portrait it is obviously the person, although interesting accessories or surroundings may be introduced. In a group it may be a smaller group within a larger collection of persons, or some one person only; in a landscape perhaps a certain bit of river-bend, tree, shadow, or light, rain-cloud, dancing glitter, or other feature. On the other hand, it may not be any specific object or part, but a phase of the whole,—the calmness of an evening sunset, the swaying of the branches in a gale, the softness of a misty day. But whatever it is, it must not leave us in doubt between this and something else. Thus if it be, let us say, a certain group, we must not have any other person so forcefully presented. "One captain, one ship "is the artist's motto. And as on shipboard there

is a range of authority from the commander to the cabinboy, so in a picture we have not only quality but

gradation of power.

This is sometimes called subordination, relation, etc. It is a very far-Subordination reaching principle and applies not only to choice of material or subject-matter, but also to treatment. Thus, suppose our principal object be a bit of sunlit foreground rock casting an important shadow. We may have other rocks, but they must not be so prominent. Again it applies to light and shade. There must be only one principal high-light, to which all other lights must be subordinated. Similarly, one deepest shadow, and this without any real rival. Of course, the strongest light and strongest shadow may or may not be close together, and may or may not be part of the principal object of interest. But, in any event, form must not compete with light and shade; one or the other must be the more important.

In the same way, if our chief interest be in the landscape, the sky must be duly subordinated. Or if the sky and cloud be our feature of chief interest, then the

landscape must be subordinated.

Herein a large number of technically good photographs entirely fail as pictures. First, they are overcrowded with too many objects which are often of practically equal interest. Again, they are all equally in focus, or they all have the same light-and-shade treat-There is no restraint, no suppression, no subordination of parts, no relationship of interests. It is as though we had an orchestra of many excellent performers, but all playing different tunes at the same time, and every one trying to outsound his neighbor. Let the reader bear in mind that principality and its attendant subordination applies to selection, arrangement, form, light and shade, sentiment, and indeed to every other aspect of art work, and that it applies to all kinds of art work, just as it does to the relationships of a family, a business firm, a town, a state, a nation.

Every man as good, as important, as his neighbor, may serve as an electioneering cry, but it certainly will not do in picture-making. Having, then, determined

upon some leading feature, etc., all the others must be arranged in due subordination to the chief and to each other, so that we must not have two exactly equally interesting features, shadows, lights, etc.

By way of crude example, see Fig. 23. An Example We have a bridge with several a ches or openings. These are all of different

sizes and shapes, and they give different shadows.

This little sketch may also serve to Repetition illustrate another pictorial principle, variously called repetition or echo.

Thus in the bridge (Fig. 23), we find repetition in the form of the various arches in the bridge. The two small boats, quite secondary objects, repeat or echo each other. the two bits of foreground, rock and so on.



FIG. 23

Prout lays great stress on this principle. Ruskin aims at showing that it is the repetition, or echo principle, which engages our sympathetic attention and suggests

to us the kinship of parts in a picture.

Of course, if we carry it to an extreme we get monotonous symmetry instead of balance. Thus does one principle run into another. Now, balance or repetition, for though not quite the same they yet are closely related,—applies not only to form or shape, but also to masses, to light and shade, color, or, in our case, color values or tone relationship.

It may be noted that where the principle of repetition is made a somewhat strong feature it usually conveys the sentiment of calmness and quietness. an object and its repetition by reflection in calm water will occur to the mind. The echo of a quiet building suggests calmness, as does the note of the cuckoo on a

quiet summer's afternoon.

This brings us to another principle to Interchange which many artists have attached very great importance; viz., the principle of interchange. We can best explain this by another very

crude example. In Fig. 24 let us suppose that we have a bit of rock and sea. Roughly, the picture space is diagonally divided into a light half and a dark half. If, now, we take some of the shade from one triangular half and carry it over into the light triangle and bring



FIG. 21



FIG. 2

back a patch of light and put it in the dark part, we get an interchange of light and shade, as in Fig. 25. This at once gives us a more decorative effect and one which shows how the blending of opposites gives force and interest. It exemplifies the union of opposites or complementary things, of sound and silence, of rest and motion, tragedy and comedy, tears and laughter, male and female. Here again we find this principle applying not only to an interchange of light and shade, but

also to large and small masses, straight and curved lines, and so on. This principle is closely associated with contrast, where things of opposite character are brought together, each adding force to the other. Of course great care is needed lest this interchange principle be carried to excess and we get the patchy, spotty, irritating effect of a chess-board of black-and-white alternating patches. Breadth of effect is perhaps the most precious quality which a picture can possess. From interchange we very naturally pass to the powerful factor of contrast and its uses.

Contrast

This principle has already been mentioned, but we may add one word to draw the student's attention to the idea that by contrast we bring out the inwardness of thought; contrast reveals character, e.g., the straight line alongside the subtle curve which at first we took to be a straight line; the high-light which is a tinted gray when a still stronger light is put beside it; the shadow which is now darker still because it is against a strong light. It is the contrast of the strong man tenderly handling the helpless infant that touches our humanity and makes

us laugh, though with tears in our voice. After some great strain and anxiety has come relief. Do we not remember how the contrast was like a warm hand on a nearly frozen heart, a touch that was felt, but could not be described. Truly, contrast is the keenest tool in the artist's hand, be he painter, poet or playwright. And as a tool is sharp so must the greater care be exercised in its use. The greatest restraint is needed. The greatest self-control is required.

Says Ruskin: "A too manifest use of

A Warning this artifice vulgarizes a picture. Great
painters do not commonly or visibly ad-

mit violent contrast. They introduce it by stealth, with intermediate links of tender change; allowing the opposition to tell upon the mind as a surprise, but not as a shock." Again, "Inferior artists destroy their work by giving too much of all that they think is good."

Now, although these sentences were written for painters, yet we photographers may well lay them to heart, for indeed we need this wise counsel. Those who are at all familiar with the current work of present-day photographic exhibitions know full well how a strong strain of artistic vulgarity marks certain styles, which aim at notice rather than critical appreciation. Loud, noisy skies, indecent subjects, bravura treatment, impossibilities of chiaro-oscuro all add their quota. But let us draw the veil of charity and hope for better, quieter things, where self-restraint rather than self-advertisement shall be uppermost.

Opposed to contrast is the principle of continuity. This, again, is a certain subtle quality which is found in all good art. The principle applies in many ways, e. g., continuity of line, where one curve leads the eye to another curve; of light and shade, whereby we pass pleasantly and without shock from part to part, and thus are made to feel that the lights and shades of the picture belong to each other. They are the bread and water of the picture's life. Again, continuity of planes is felt in all good art work. In stage scenery we have our figures on, let us say, a roadway, and beyond these we see the back cloth, conscious that between the

roadway in the foreground and the distance beyond is no real relation or continuity. There is a vast gap, mental and physical, which is entirely destructive of continuity. Now, in most outdoor work, such as landscape, we have at least two, and generally three distinct planes; viz., foreground, middle and extreme distance. Practically, always in nature these melt (by continuity) into each other by imperceptible grades or steps. We know that we could pass from one to the other without a break. The stage scenery makes us feel conscious of gaps, whether we see them or not, and any picture which gives the feeling of disconnected parts is similarly faulty. A picture which consists of a foreground only, as interior work, often gives a confined shut-in feeling. The same thing may occur in a study of a mountain pass, woodland or street scenery, and in many other "foreground only" subjects. In a case of this kind there does not seem to be room enough for the imagination to have free play. Such pictures do not deeply move us, unless the interest is that of human figures.

If the middle-distance part is absent we feel a gap like that of stageland. If the extreme distance is absent we miss the feeling of space and air. If the foreground is absent we find it difficult to take any keen interest in the subject. We feel that we could

not "walk into" the picture.

Concentration of Interest very careful to remember that in no picture can the interest be equal in all three parts. Usually, but by no means always, one's interest is chiefly in the foreground; but it may be in the middle, or extreme distance. This point must receive very careful attention. It is by a discriminative adjustment of focus and distribution of light and shade, leading lines and so on, that we can direct attention to this or that plane in the picture-field.

Separation of Planes

Moreover, it is of importance that the various planes or parts be so differentiated from each other that we are never in doubt as to which are the nearer or more distant parts. In nature we judge of distance partly by

the stereoscopic effect, or parallax, of double-eyed vision, partly by size of known objects, but chiefly by aërial perspective. It is in this that so many landscape photographs fail to convey a proper suggestion of space and distance. And for two reasons. First, the lens is "stopped down" too much, so that the picture gives a greater definition, range, depth of focus, or depth of field, call it what you please, than the eye sees. Secondly, the use of non-color corrected plates entirely falsifies tone values and destroys aërial perspective. Other contributing causes to these failures are the use of lenses of too short focus, faulty exposure and development, small scale of foreground objects, etc.

Consistency:
Harmony

These are terms used to convey, in part, some of the ground already touched upon under fitness, etc. There are, however, one or two details which may now be dealt with under these headings. Note that continuity unites the various parts of a picture into one. As the limbs and parts of the body are united into one body, so consistency and fitness bids us aim only to blend those parts which belong to each other and so form a natural whole. It is consistency which not only unites, brings together, and composes the parts, but it uses, employs them as

contributing something to the sum total.

Harmony only to the bringing together of the parts of the picture, but also to the treatment of the different parts. One naturally looks for the same style of handling in the sky as in the landscape parts; more than that, we look for a certain harmony between the sentiment of the subject and its treatment. Thus we should expect to find one treatment for a picture of delicate flowers, another for shrubs and sturdy plants; one for evening calm, and so on.

Harmony, again, is employed to denote the true and proper relationship of tone or light and shade values of

the various parts of a picture.

Mystery Work. The true artist exercises selfrestraint, and suggests rather than tells his story. He starts the imagination and indicates the



PLATE L



PLATE M

From a photograph by F. C. Lambert

direction in which he wishes it to flow. He recognizes the fundamental principle that minor truths must be sacrificed to major truths, for they must not all be dis-Some must be omitted. This he does by omitting unimportant detail, by breadth of arrangement in light and shade. How often do photographers fail at this very point. Instead of chiaro-oscuro we get spottiness and patchiness, and trivial details are as sharply defined and recorded as though they were matters of importance. By choice of time of day and direction of lighting, the photographer can do much in the matter of breadth. Judicious exposure and guarding against over-development will also help. The wise choice of printing papers of a proper degree of roughness and surface texture will help. Again, the use of a wisely chosen stop in the lens or the use of a pinhole at certain times will go a long way in the right direction. The posing of figures in genre may also be made to aid us.

A photograph has been called a "dead sentiment record of living nature." This contains

a germ of truth, and though but a very partial truth it should teach us a valuable lesson. most instances the cause of failure is not that it is a "dead record," but that it is an unfeeling one. subject has not really appealed to the photographer, perhaps because he is not very susceptible of fine feeling or sympathetic, but more likely because it is in itself commonplace. "The usual thing" has now acquired a fairly well known meaning to photographers. It occupies about nine-tenths of the wall-space of most small exhibitions. It is seen and forgotten in two minutes. Why? Simply because it is a commonplace subject treated in the usual way, it lacks character in itself, is just like a thousand other scenes, and it lacks personality of treatment, i. e., might have been done by any one of a score of our acquaintances.

A scene, to have a fine sentiment, must appeal to memory and association and stimulate the imagination. Sentiment is often confused with sentimentality. The sound of the two words is similar, and their root is the same, just as is the case with cant and chant, but in both instances the meanings are different. Sentiment

is based on truth; sentimentality is never true, it is

always something assumed, affected.

These two ideas are so closely asso-Spacing and ciated that we may consider them to-Placing gether. By "spacing" we mean assigning a place within the picture frame to those objects which we consider of chief interest. Thus, in dealing with a group of human beings, or cattle, or other strong objects, much of the decorative effect of the result will depend upon how we space or interspace the various members of the group. A few inches this or that way of one member of the group may make all the difference between failure and success. It is in the foreground chiefly that we can influence the spacing of the parts of our composition, either by moving our viewpoint or by moving some of the objects, adding or removing a tuft of grass, branch of tree, piece of rock, etc.

Placing refers to the position which the more important parts of the picture are to take in relation to the

margins of the picture; thus, a high or low horizon, moving a group toward this or that side, showing more or less space above the head in a portrait, and so on.

Spacing refers to change of position of the various parts of the picture, relative to each other. One instance may serve to show this. In Figs. 26 and 27 we may see the effect of



giving more or less space above the head of a figure. Fig. 26 suggests a short person, while Fig. 27 gives one the idea of a rather tall one.

Accentuation and Isolation closely related. For if we wish to accentuate a certain feature,—say, the sower or reaper in the field,—we do not surround him with a lot of other figures or conflicting incidents, but rather strive to isolate him as much as our judgment tells us is helpful. If our figure is in strong light we accentuate it by isolating it from other near or conflict-

ing lights and employ a dark background, open door, tree trunk, shadow or rock, or vice versa, e.g., a dark figure isolated and so emphasized by a sky background. The photographer here again needs a word of caution, lest he be tempted to vulgarize his craft by too great display. We can do a good deal in the way of accentuation by the judicious use of the stops of our lens and observingly differentiating the degrees of sharpness of definition in the different planes.

Isolation of course implies subduing certain parts, simplifying and selecting only the really essential features. This logical position follows close upon the principles of subordination and principality already

mentioned.

Every artist is charged with exaggeration; but in great art it is not exaggeration but emphasis which makes for strength. It is only when the things are isolated that we really see them and then think for the first time how full of character they are. No one thinks how sweet are bread and water until he has been

really hungry.

Just one more topic before I close the Personality: list of qualities, a list which seems to have no end. We are often told that photography is not an art method. But let any observant person who has made it his interest to study current photography of the best kind as seen at our leading exhibitions, let such a person go into an exhibition of work not previously exhibited. It will be easy enough for him to assign quite half the pictures to their respective producers. This is a conclusive answer to those who say there is no personality in photography. Individuality shows itself in choice of subject-matter, in styles of arrangement, in focus and printing method, in fact at every point. Let half-a-dozen of our best landscape workers deal with the same bit of nature. They will give us half-a-dozen quite different results, all true from their respective producers' aspect. Now, personality or individuality of style cannot be taught: it should not be forced by imitating any one else, and unless it is quite spontaneous it will be spurious, sham, unreal.

The only bit of very positive advice that I shall allow myself to offer in this book is this, "To thyself be true." Don't try to like what you do not honestly like. Do not imitate any one. Deal only with the subjects you honestly love. Never mind fashion or critics. Be honest to your own self. Do not affect a style. Study all styles, learn from every one, and never be satisfied with yourself.

We have now very briefly and imper-A Few fectly touched upon perhaps the most Examples important principles underlying pictorial composition. Our list is very far from complete. never can be complete, for as knowledge grows, so new aspects are presented. Ars longa; vita brevis. have assumed all along that the reader is familiar with the meaning of such words as tones, scale, range, values, perspective, atmosphere, relief, gradation, etc., as used by art workers. Now we propose to glance briefly at the various photographic examples among these pages, with a view to applying what has been herein said.

Note two points at starting. These examples have been chosen, not for emulation, but simply as very ordinary photographs which happen to illustrate certain principles of composition. If they do this, they have served their present purpose. The other point is that, as in language, we may read many pages without meeting with a certain grammatical construction. Yet it may be a construction of considerable importance. So we may see many pictures without finding certain quite important principles exemplified. In some cases a picture may show several principles, in others only one or two seem markedly shown.

This print illustrates the effect of nu-Plate E merous leading lines of the tree trunks,

tending more or less in one direction, suggesting wind or a tendency to move toward the left. The small house in the distance is a valuable aid to balance effect. If this be covered up by the finger its importance to the composition is at once felt. Without it the picture is all foreground; with it there is the suggestion of greater space and distance. These tree



PLATE N



PLATE 0

From a photograph by F. C. Lambert



PLATE Q

From a photograph by F. C. Lambert



PLATE R

From a photograph by F. C. Lambert

trunks illustrate radiation and the subtle curvature of organic forms. The straight telegraph pole gives contrast, the house helps us to differentiate the various planes. The simple background, by isolation accentuates the group of foreground trees.

Here we have many illustrations of radiation of lines in the nets, and so forth. Balance of line is also exemplified. The principle of echo, or repetition, is well shown by the three small nets to the left, and these as a group repeat those on the right. The various foreground and middle-distance planes are well marked, but the distance is appreciably absent. Straight and curved ropes are contrasted. The curving, diverging roadway-lines invite us to walk into the picture.

Here we see the "shut-in" effect due

Plate G to having nothing but foreground. Interchange of light and shade is illustrated by the white dog with shirted boy to right and lightcoated rider and horse to left. Our interest is kept within the picture by the group, for the two figures, though at opposite sides of the picture, are evidently associated with each other. The patch of sunlight on the wall near the dark part under the bridge shows the power of contrast. The trees toward the distance are softened, to suggest massing and atmosphere. strong line of river-edge is balanced by the short portion toward the left lower corner. The light and shade are fairly well massed together. Gradation is also well illustrated. The one group of horse and boy is repeated, or echoed, by the dog and boy.

This example is introduced to show what is meant by the three regions of ordinary landscape, foreground, middle and extreme distance, due to aërial perspective. The well-defined dark tree to the right helps to throw back the less sharply defined and lighted trees beyond. The one straight short line gives a note of contrast. The near river-bank is an example of very refined curvature. This is balanced by the general trend of the distant hills. Mystery of distance gives play to the imagination. We feel that the mind could linger in contemplation.

In this print is demonstrated the importance of decorative form, or "essential forms," as some term the principle. In the foreground snow we may see the shadows of an object not itself seen in the view. Now the shadow-form not only serves to give some interest to what otherwise have a somewhat blank snow-patch, but it also tells us a good deal about tree forms and the decorative effect of radiating lines in small groups. The example also shows that we may at times have our chief lights and darks in the middle distance. Here again we miss the space feeling due to absence of an open distance.

is introduced to show the effect of an absence of near part or foreground, and concentrated interest in the distance and sky. The two dark tree-clad islands are too much the same size and shape for good balance effect. They are too nearly equal — not subordinate one to the other. Breadth of effect is fairly well shown. The bit of light boat-track to right shows the value of contrast and interchange, without disturbing breadth. Note how the cloud-lines balance the sky-lines of the distant hills. Radialism of line is also shown in the outlines of the hills originating from the head of the lake. The bit of cloud against the hillside exemplifies interchange.

is an instance of a short scale of tones in a middle key, showing the delicacy of gentle gradation. In general, subjects of the class tend toward the opposite extreme; viz., violent contrasts of light and shade, under the mistaken idea that violent contrasts suggest strong light. Note that the direction line of the path is adequately balanced by the shadow cast by the tree on our left. The two tree trunks fairly well balance in form and line, but the one to the right should be lighter; it is not properly subordinate. The chief theme here is the expression of sunlight, a case where the principal object is a general effect prevading the scene.

Plate M is an example of principality in another way. The old mill-house is, of course, our chief interest. Note how the two fowls carry a bit of light away from the lighter end of

the building, illustrating interchange, while the light ends of the house against the dark foliage beyond exemplify contrast. The wheel-tracks of the roadway well exemplify both radiation and curvature and invite us to walk about the picture. Isolation is shown in the placing of the building. The placing of the house somewhat high up shows the use of a high horizon line. Sentiment and association find play in the old out-ofdate building. The dark trees beyond give the effect of mystery exciting the imagination.

Although we are not supposed to be Plate N especially concerning ourselves with figure subjects, we may permit just one It may be explained that the figures are example. Welsh shrimping women going to work in the evening. A debate is going on as to which part of the coast is most promising for a "take," etc. This example shows a case where the interest is almost entirely in the foreground figures, and points the necessity of keeping all other parts (including sky) in a decidedly subordinate place. The bit of evening light in the sky is made to connect the members of the group. Straight and curved lines are contrasted in the fishing nets. The one independent figure is made to balance the other three. The spacing of the figures points to a constant proportion of distances.

comes by way of a contrast to the last. In this case all our interest is in the sky and sunset effect, showing the last gleam of dying day, -" Earth's last kiss to the dying day." The sun's waning light for the last time glints along the slowly winding stream at low tide. The long horizontal lines of the shore tell of expanse, flatness, quiet, The shore-lines are all nearly straight and more or less parallel. The placing of the low horizon adds importance to the sky.

The next two examples, P and Q, exemplify two matters for which we could find no room in the previous pages; viz., the up-hill and down-hill effects. The subject is far too complex to go into just now, but the examples here shown may be of interest, as showing the fallacy of the common belief that it is only a matter of low or high horizon. For in both these cases we have high horizon. The up-hill effect is, of course, very much the easier of the two to obtain. The example illustrates also contrast,—trees against sky; radiation of tree roots; line of pathway; strong contrasts of foreground; transparency of sun shadows, etc.

The down-hill effect is largely a matter of suggestion and association. In this instance certain help is gained by the perspective effect of the buildings. In this way an appeal to memory is made. The three planes are here well illustrated, although, of course, our motif is entirely in the foreground. Balance of line, of mass, and of light and shade may be seen. Note the difference between a white object in direct sunlight and in shadow. The necessity for a very quiet sky is here shown. Note the telling effect of the small bit of deepest dark in the window, against the highest light of the sunlit house end.

Finally, we may apply some of our Plate R principles to just one portrait study. A

first glance will show that the glinting lights on some of the buttons are too strong—are not duly subordinate to the chief part; viz., the face of the person. Radiation is shown by the various lines of the cape converging upward toward the face. Contrast is shown by the light face and dark hat and cape. Interchange has carried us a little light upon the turned back part of cape and silk lining. A quiet isolating background gives emphasis to the head.

One need hardly say that this print is from an entirely untouched negative. Of course, after careful study of such a print, a very little retouching of just the right kind and degree will make a very great difference. But retouching should not be attempted until the retoucher has studied composition and knows exactly what he wants to alter, and why he wants it, and how the desired result is to be obtained by the least possible change of the original negative. F. C. LAMBERT.

Potes

An interesting lecture upon "Improved Methods of Producing Color Values for Monochrome and Three Color Printing" was given by Mr. John Carbutt before the Franklin Institute on the evening of October 29. We hope to present a further note about this in a later issue. We hear that the Carbutt Polychromatic plate has proven itself a remarkable success among workers interested in the correct reproduction of color. This plate is now made in two series, C and D. The plates of Series C are extremely sensitive to red, with a subdued sensitiveness to green. The D plate is extremely sensitive to green and rather less sensitive to orange and red. The prints sent by Mr. Carbutt made with the two series exhibit a remarkable showing for the comparative value of the plates.

4

"Great oaks from little acorns grow," says the old proverb, and from the handy little E. W. N. specialties, manufactured by Mr. E. W. Newcomb, in a little hired office in the Bible House, New York, we now learn of a finely equipped and commodious factory, built and owned by Mr. Newcomb at 20 Hoyt street, Stamford, Conn., a delightful suburb located a few miles from New York. In his new factory Mr. Newcomb has arranged a model dark-room, laboratories, etc., for his experiments, and is also provided with ample space for the requirements of his publishing and manufacturing departments. We rejoice in his success and wish him still greater prosperity.

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The abridged 1903 catalogue just received from Ross, Ltd., London, is one of the most interesting announcements thus far issued by this enterprising house. It gives particulars of the Homocentric and other lenses manufactured by Ross, Ltd., including the Zeiss and Goerz series, together with a variety of hand-cameras, field-glasses and photo-micrographical apparatus. The particular interest of the catalogue, however, lies in its superb illustrations, covering almost every branch of photographic work, the negatives having been made by one or other of the Ross lenses. We have not seen better illustrations of lens work in a long time. Copies of this catalogue can be had on request from Ross, Ltd., III New Bond street, London, by asking for Catalogue A. American readers applying for English catalogues should be careful to note that foreign letter postage is 5 cents per half-ounce.

The International Photographic Exchange, of which Fayette J. Clute, Marye Terrace, San Francisco, is the director, is gaining substantially in membership and repute. Mr. Clute tells us that there has recently been a considerable addition to the list of members in New Zealand, which is quite in keeping with the world-wide character of the Exchange. This Exchange is "a good thing," and many of the readers of THE PHOTO - MINIATURE could doubtless profit by its facilities for the interchange of prints. The membership fee is nominal, the advantages are innumerable.

A

The Obrig Camera Company's "Handbook of Photographic Supplies," just received, is a compact booklet of 64 pages, well arranged and illustrated. It gives a comprehensive glance at the thousand and one attractive specialties handled by the Obrig Camera Company at their store, 165 Broadway, New York, together with the net cash prices, these being in many cases lower than in other similar lists.

Among the little things, the special outfit for the brush development of platinotype papers with glycerine, flash cotton and magnesium tape, supplies for passe-partout, bolting-cloth silk, Avery's imported NOTES 231

English backing, Paget Prize L. S. plates, and an electric storage lamp giving both ruby and white lights for the dark-room should be mentioned. The Obrig Camera Company also makes a specialty of developing and printing, together with the repairing of all makes of cameras at very moderate rates.

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The most satisfactory presentation of the splendid exhibit of portraiture at the National Photographic Convention, recently held at Indianapolis, is that given in *The Photo Era* for October. This issue includes some thirty-five examples of professional work reproduced in very tasteful style. We commend it to the attention of those interested in modern portraiture. [The Photo Era Publishing Company, 170 Summer street, Boston. 25 cents.]

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A New Hampshire subscriber who has been working in orthochromatic photography, after reading The Photo-Miniature No. 6, says: "With regard to photographing flowers and fruit, you seem to deal only with yellow, orange and green. How about white and green, as when one photographs a strawberry patch? What kind of screen would you advise for this? Also, what have you to say upon photographing dahlias?"

Our reply to this letter may be helpful to some of our readers. To begin, we suggest that our correspondent should read THE PHOTO-MINIATURE No. 13, dealing with "Photographing Flowers and Trees." By using a good orthochromatic plate, such as Cramer's or Seed's or Orthonon plates, no screen is necessary to obtain satisfactory renderings of yellow, orange, white or green. Where there are flowers containing blue or purple, a light yellow screen to restrain the excessive activity of the blue and violet rays would, of course, be useful. The red, doubtless, presents a more difficult problem. Red is a refractory color to photograph. The writer of the monograph in THE PHOTO-MINIATURE No. 13 says: "I have worked with dahlias of all colors, from almost black to pure white. When I

have a dark red dahlia, my plan is so to arrange the lighting as to throw an inordinate quantity of light directly into the flower, shading the foliage if it is possible during the exposure. Thus I endeavor to compensate for the refractory color of the flower by overlighting it, without, of course, using direct sunshine. In addition to this, a very much longer exposure is required than that needed by any of the other colors, from four to six times the normal exposure being rarely too much if a good plate is used and the development is carefully handled." Although unable to speak from actual experience, we are inclined to the opinion that the Seed L Ortho plate, with their Chromatic Corrector, would about meet the requirements of the case; although the use of a plate specially sensitized for red, such as the Carbutt Polychromatic, together with an adjusted screen, should be equally, if not more satisfactory in results.

4

Among the little conveniences which make the pursuit of photography pleasurable rather than difficult, mention should be made of the Kodak Push Pin. For every purpose where a pin is useful in photographic manipulation, as in the handling of films and prints, the Kodak Push Pin is without a rival, readily seen on the work-table, easily picked up and efficient in use. The reader who once appreciates its advantages will not willingly work without it thereafter.



There are many signs of a revival in the popularity of flash light photography this winter. More especially popular favor is returning to the use of pure magnesium in place of the compound flash powders, as giving a softer and less abrupt lighting. Among the lamps introduced this season for the use of pure magnesium, the Aurora flash lamp, manufactured by G. Gennert, New York, deserves mention as a thoroughly reliable article, efficient for this purpose and moderate in price. We note that this firm has also introduced a new metal

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tripod, usually compact and weighing only 2½ pounds, with an extension capacity of 4 feet. This tripod is known as Passy tripod, and when folded measures only 13 inches in length. The Passy should speedily win favor among many users of small hand-cameras abroad today.

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The virtues of the combination of metol and hydrokinone are well known among photographers, but the delicate balance between the two components required for the best results is not so well understood or appreciated. The use of an equal portion of metol and hydrokinone gives the effect of both agents, but if the hydrokinone be in excess, the metol is thereby overpowered and some of the qualities are lost. Furthermore, we have hydrokinone and hydrokinone. In buying this agent care should be taken to specify Hauff's hydrokinone.

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Photographers in the Southwest will hear with regret that Mr. Menzies Cumming, for years the genial editor of the breezy "Southwest Photo," of Dallas, Texas, has severed his connection with that journal, which again passes into the hands of the C. Weichsel Company, of that city. Mr. Cumming is a veteran in photography and has brightened its journalism with his keen and thoroughly good-natured personality. May happiness abide with him.



The light value of the magnesium flame.—Dr. Eder has been examining the chemical brightness of the flames of magnesium, aluminium and phosphorus, and an abstract of his work is given in the Journal of the Society of Chemical Industry. The author uses the term "chemical brightness" to signify the degree of light action upon a plate or surface of silver bromide in gelatine. Magnesium light alone is not directly suitable as a

standard for exact photographic purposes, as the effect of a given quantity of magnesium depends upon the method of igniting, the nature of the metal, whether ribbon or powder, the surrounding gaseous medium, and the admixture of substances capable of giving off oxygen. In an atmosphere of oxygen, the action of burning magnesium is three times as great as in the air. Small pieces of ribbon have relatively smaller effect than larger pieces. Aluminium leaf burns rapidly in oxygen, with emission of a strong and powerful light, while phosphorus is only photo-active to a small degree as compared either with magnesium or with aluminium.—Photography.

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The Prosch Manufacturing Company, of New York, sends us news of a departure in flashlight photography in the shape of a device for disposing of the smoke. This company has been experimenting for many years along these lines and has established its priority of discovery in this and all other countries of the idea of eliminating the smoke from flashlight work. It has at last perfected its devices and has covered them thoroughly with patents, so that by the time the flashlight season opens the numerous professional photographers who have needed something of this sort so long will be able to use the new method originated by the Prosch Company.

4

We have received, says the British Journal of Photography, the announcement that Professor Abbe has at last, in accordance with his intention, retired from the active management of the firm of Carl Zeiss. It is with deep regret we receive this news, as we believe the determining cause is the present condition of Professor Abbe's health. We trust that in laying down this burden he will recover sufficient strength to enioy many more years of scientific work, for we gather that, although he retires from the management, he will continue his association with the firm as scientific and technique.

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nical adviser. Dr. Siegfried Czapski will succeed Professor Abbe as head of the board of management of the firms of Carl Zeiss and Schott and Genossen, and Herr Max Fischer will be his deputy in the management of the firm of Carl Zeiss. Prof. Dr. Rudolf Straubel joins the board of management of the firm of Carl Zeiss, and receives power of attorney. As at present constituted, the board of management of the firm of Carl Zeiss comprises the following names: Dr. Siegfried Czapski, Max Fischer, Dr. Otto Schott and Professor Dr. Rudolf Straubel. We trust the justly celebrated firms of Carl Zeiss and Schott and Genossen will long enjoy prosperity under the new board of directors.

.4

We have received from the G. Cramer Dry Plate Company the following formula for the tank development of Cramer plates: Stock Solution—Water, 32 ounces; carbonate of soda (dry), 2 ounces; sulphite of soda (dry) according to desired color of negative, 1 to 1½ ounces; bromide of ammonium, 30 grains; citric acid, 30 grains; hydrochinon, 1 dram; glycin, 2 drams; metol, 2 drams; pyro, 2 drams. Dissolve the chemicals in the given rotation. To preserve the stock solution we recommend filling the same into small bottles of the exact size, to hold enough for making the diluted solution for the tank. The bottles should be quite full and tightly corked. For use take: Water, 120 ounces; stock solution, 6 ounces.

The developer should be used fresh, and its temperature kept between 60° and 65° F. until development is completed. Immediately on immersing a plate in the tank solution move the plate up and down with a quick

motion to prevent streaks and air-bells.

A

Rev. H. F. Swartz, who has an interesting paper on "Measuring the Density of Negatives" in Wilson's Magazine for October, writes that he has just secured

patents for a dark-room lantern burning either oil, gas or electricity, and employing a fluid filter automatically cooled by draft. The lamp is said to emit from 25 to 100 times as much light as is afforded by other lanterns, and with perfect safety. It is further claimed that the temperature with this lamp does not rise above a degree easily borne by the hand. The appearance of the Swartz lamp on the market will doubtless be awaited with much interest by workers who have to deal with color-sensitive plates.

4

A valuable digest of the "Dyes and Pigments used in Photography" by Mr. Fred Edwards, which recently appeared in *The Amateur Photographer* of London, is republished in the October number of *Wilson's Photographic Magazine*.

Postscript to Po. 26 The Photo-Miniature

Under this heading will be published occasional postscripts to earlier monographs in The Photo-Miniature series, giving new or additional information.—[EDITOR]

In The Amateur Photographer of October 15 Mr. Claude H. Barfield tells how any one possessing a good pair, or, better still, a single opera- or field-glass, can turn out creditable telephotographs. This should interest those who enjoyed Mr. Frank S. Dobbins' monograph on Telephotography in THE PHOTO-MINIATURE No. 26. We therefore reprint his paper. The rapid rectilinear lens used by Mr. Barfield was one of 9 inches focal length, and his exposures (with the operaglass combination) averaged 3 seconds in diffused light at 8.30 A. M., August, a plate of ordinary rapidity being employed. We quote:

The first thing to be considered by any one taking up this branch of photography is camera extension. This is a most important item, as the extreme narrow angle of these glasses necessitates a long focal length. Supposing that we intend to adopt an opera-glass upon a half-plate camera (that being the most suitable size) we shall require an extension of at least 18 inches. As, however, the major portion of half-plate cameras now made are provided with that amount of extension, there

should be no difficulty on that account.

No attempt should, however, be made to fit this arrangement upon any camera of anything approaching a flimsy build, as the weight of the glass would, in all

probability, wrench the front off.

If the camera has not a long bellows extension, a suitable one might be constructed. This should not be fixed in the form of an extension upon the lens board,

as this would not be of sufficient strength, but should consist of a length of wood placed along the entire length of the camera baseboard, and secured to camera by a screw, passing up tripod screw in camera base. The additional part can then be fixed on runners on that portion of board which projects beyond camera front. This will give the whole thing a very rigid front to carry glass on. A tripod screw should be let in the middle of this extra base, so that it is evenly balanced.

As regards the opera- or field-glasses, which we intend to use as a lens, they should be a good strong pair, and not too heavy. To test an opera- or field-glass, focus it on some bright object, and then glance at the corners; if they are blurred, the glass will not do. With anything approaching a modern glass the corners ought

to be clear and sharp.

The definition can be considerably improved by the insertion of a suitable stop; this has the effect of improving the definition, but at the same time it lengthens the exposure. To make the stop, proceed as follows: Draw out the tubes of the glass to their farthest extension, and then measure the distance between the The point midway between the two should then be marked on the inside of the tube, and diameter at this point ascertained; this can be done either by means of a pair of calipers, or by cutting and testing small bits of cardboard. When the correct diameter has been found, a circle of black tin or card should be cut out to fit in the tube at this point. In the center of this piece of card or tin a small hole should be bored; this should be then enlarged by means of some sharppointed instrument being inserted in the hole and twisted round. This hole should be about half an inch across, and, with the rough edges removed, will make a very good stop. The stop need not be glued into the tube, for if the tube tapers it can be wedged in.

The lens having been finished, we can set about fixing it to the camera. As most opera- and field-glasses are made in pairs, it will be necessary to detach them. To do this requires only a little care, for the screws that hold the parts together can generally be soon found.

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If this is impossible, or it is not desired to separate the glasses, both glasses should be fixed to camera front.

Taking first the single glass, the following will be found an easy method of fixing: As all of these kinds of glasses, by reason of their shape, taper toward the eyepiece, they can be wedged in the lens-board. ordinary lens should be unscrewed and the glass fixed in the lens flange; if, however, the glass is too small or too large to fix firmly in the lens flange, the lens-board should be removed and a new one slipped in its place, with a hole cut in it of the right dimensions. In the case of the glasses being unable to be detached, some kind of support must be fixed to the front of the camera, or, if the glasses are large and heavy, a good plan would be to support them on a second tripod in front of the lens-hole, all extraneous light being excluded by means of a black sleeve fitting over the front of the glasses.

The focusing is done in the ordinary way. On an inspection of the image on the screen, it will be found dimmer than with an ordinary lens; it can, however, be easily distinguished. It will be found that the greater the distance from the eyepiece of glass to the plate the larger the image, and at the same time the nearer must the two lenses of opera-glass be (the glass must be inserted, of course, with the eyepiece toward

the plate).

When the image has been roughly focused, it will be found very convenient to fine-focus it by means of twisting in and out the portion of tube carrying the

front lens, until the image is sharp.

If, however, when the lens has been fitted to camera and a plate exposed, it is found that the image at the very edges is not sharp, plates of a smaller size should be used, by means of carriers fitted inside dark slides. If it is found that without a stop placed in tube of lens the image covers the whole plate, but when a stop is inserted the corners are dark, it shows that the stop has not been placed midway between the two lenses. If, too, it is seen that while the middle and one side of the picture is quite sharp, but the other blurred, it denotes that the glass has not been fixed at right angles to plate.

It will soon be discovered that when the camera is placed upon a tripod, extended to its farthest extent, and an opera-glass fixed in front, it is very apt to vibrate in a light breeze; the writer spoilt half a dozen plates before the real defect was hit upon. The only way to remedy this is to provide some sort of support to camera front. When working from a window, any makeshift support will do, but for out-of-door work

something more rigid is required.

A good plan is to use a piece of thin string, to hold the front part steady. When the front is extended for use, the string should be tied to one side of the extension part; the string should then be threaded through the lower half of the tripod leg, brought up again, and fastened lightly to other side of camera extension. Care must, of course, be exercised to see that the front of camera is not unduly strained, or it might be fractured. Perhaps a better plan would be to carry a length of rod. about four feet long, to place under front of camera, the other end resting on ground. If both of these methods are objected to, there are several extra stands for supporting a long camera front on the market. The next question is that of shutters. If the reader is a possessor of a detachable roller-blind shutter, he might be able to fix it on front of glass, as these are usually made with much larger openings than the hoods of the lens they have to fit, the remainder being filled with a rubber adapter; if not, an ordinary cap must be used.

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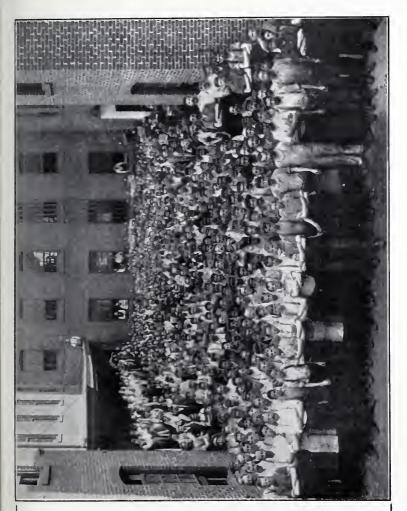
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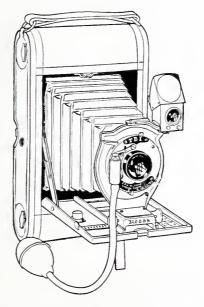
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Every now and then a pessimistic writer, who usually has some axe to grind, rushes into print with a warning to all photographers that they are about to be, or have been, or may be subjected to extortion on the part of photographic manufacturers. The facts are that, quality considered, the general trend of prices is downward. Who would not prefer the No. 2 Flexo Kodak of to-day at \$5, to the \$25 Kodak of a dozen years ago, even though both sold at the same price? If both were offered you at the same figure, which would you take, the \$25 No. 4 Cartridge Kodak of to-day, or the \$50 No. 4 Regular Kodak of 1892?

Little improvements that cost us a few cents extra on each camera are being made constantly—and nothing said about them. The latest improvement, however, is one of so great importance that we feel especial attention should be called to it. On the foregoing page we show the new Model No. 3 Folding Pocket Kodak with the F. P. K. Automatic Shutter.

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For the benefit of those interested, we will give here, each month, a bulletin of the important photographic contests in progress throughout the United States.

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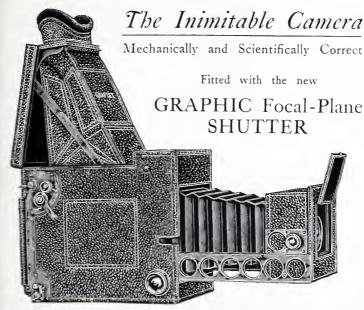
They will meet a long-felt want on the part of amateurs such as I am, and I hope to use them this summer. I. H. FARGIE.

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During three days I exposed four dozen 1/2-plate Kodoids, comprising interiors, architecture, landscape and snap-shots, and some very striking negatives have resulted. It has been a great boon to be able to obtain this with one speed of plate, and that one so very portable, seeing that I cycled 150 miles during my tour. It was a great thing to be able to obtain perfect negatives, free from halation, in about an exposure of 3 to 7 minutes, where I have given before 15 to 20 minutes on ordinary glass-Also in outdoor backed plates. work I was very fortunate to have clouds surmounting my pictures. In the ordinary way one generally loses these upon development, but the Kodoid records everything. F. ABRAHAMS.

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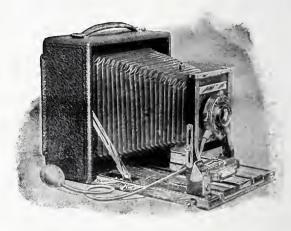
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The Prosch Manufacturing Company, of 145-9 West 18th street, New York City, is about to issue a little handbook on flashlight work to be called "Proschlite Photography," which, although its principal aim is to exploit Proschlite Magnesium Flash lamps, will contain many valu-

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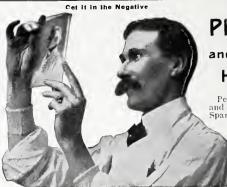
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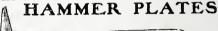
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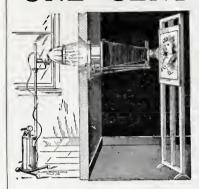
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The Photo-Miniature

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Volume V

JULY, 1903

Number 52

AËRIAL PHOTOGRAPHY

The time has come to talk about aërial photography. Many things are in the air. Every town of size boasts its skyscraper; every mountain top has its summer hostel and every country fair its balloon ascents. It is not wholly improbable that, ere many years have passed, the airship excursion will be at least as popular as the automobile tour of today, or that the schoolboy of tomorrow will study topography at first hand, from the actual fact instead of the schoolroom map. The frequent reports of aëronautical events in public prints, the activity seen at the recent International Aëronautical Exhibition held in London, and the purposed aërial tourney at the forthcoming St. Louis Exposition, are straws showing which way the wind blows. Photography must not fall behind its The telephotographic lens has solved opportunities. the ancient problem concerning Mahomet and the mountain, and our aërial resorts, from the Washington Monument to the dome of Saint Paul's, are rarely visited without the camera. It has even been suggested that the North Pole may be discovered by means of telephotography from a balloon fifty miles distant! But this is set down as an aërial flight in more than one sense of the phrase. The sober facts are sufficiently inspiring. At the St. Louis Exposition the airship will take its place with the turbine and the trolley - car as a practical factor among modern methods of transpor-Along the Potomac, Langley is busy with his gigantic aëroplanes, undismayed by failure and confident that tomorrow will uncover the long-sought secret of mechanical flight; Bell, of telephone fame, is telling scientists of his wonderful tetrahedron kite, capable of lifting a weight of two hundred pounds; Gaudron, at the instance of the British Government, is building an aëroplane of 120-horse power, to carry five persons and remain in the air within a radius of one mile from the starting point for twenty-four hours without descending. In England, Bacon, Cody and others are demonstrating the practicability of dirigible balloons and kites; in France, Santos-Dumont has accomplished remarkable feats with his motor-driven airship. The conquest of the air is well begun, and photography should play its

part in the advance.

The story of aërial photography is not The Field a long story, and is well worth knowing Described as pointing to a field of neglected opportunities. Its possibilities are novel and extremely Further, they are practical possibilities, open to all who seek a new direction for their photographic activities, upon the single condition that their inclinations lean toward the strenuous life. Assuredly it is no field for the carpet-knight or beginner, but rather for the trained amateur possessing skill and precision in manipulation. As a mere hobby, photography in mid-air offers the pleasurable excitements of untried possibilities, new views of familiar places and profitable experiences, with here and there the spice of personal risk to whet one's appetite. The results, as our illustrations show, are peculiarly interesting in themselves, quite apart from the pleasures of the chase. Seriously applied, as in warfare, meteorology, cartography, geodesy and surveying, photography from aloft obviously affords a ready means of observation and for obtaining records valuable in these branches of applied science.

Let no one think, however, that aërial photography is confined to photographing from airships or balloons, or that it is drily scientific in its applications. As here to be considered, its scope is wider and more directly interesting, including the use of kites and the making of bird's-eye views from high buildings or similar elevated points. Such points of vantage may be found everywhere, and are by no means confined to large cities. In

brief, then, a little book about aërial photography should prove a timely and acceptable addition to THE PHOTO-MINIATURE series; hence I have persuaded those familiar with the work to tell of their experiences and to show us some of the first fruits of this field.

Bird's-eye
Views

The making of bird's-eye views will be considered first, as the simplest and most readily accessible branch of photography in mid-air. Here, as in dealing with balloon work, our information comes from Mr. W. N. Jennings, a specialist whose skill is apparent in the prints herein

reproduced.

Let me emphasize the point that, although much is here said about photographing from high buildings, the instructions apply with equal profit to photographing from any natural eminence, whether it be Lookout Mountain, Tennessee; Glacier Point in the Yosemite Valley; the Grand Cañon of the Colorado; or the Capuchin Monastery which looks down upon Amalfi; or a chosen point looking over Derwentwater toward Bassenthwaite Lake, among the English lakes. mention of these famous places of pilgrimage whispers of the pictorial possibilities of the field, despite its close kinship with topography and the making of maps. The city also has its opportunities above the housetops. Mr. Jennings gives us interesting glimpses of Philadelphia and Washington from the aërial point of view. As I write, I have before me a panorama of the harbor of Valletta, Malta, made by Mr. S. L. Cassar, of that city. Taken from a neighboring height, it shows the British fleet assembled before Valletta during the recent visit of King Edward VII, the old city with its churches, fortresses and palaces serving as a picturesque setting for the animated scene in the foreground. The view fairly bristles with detail and is "sharp all over," as the phrase goes, but its comprehensiveness and arrangement give the desirable sense of breadth, and it is a capital example of the attractiveness of views from a moderate elevation. In like manner, who, having once witnessed it, can forget the panorama of life and beauty spread before the eye as, from Brooklyn Bridge, at dusk, one watches the day die over the harbor of New York and

the myriad lights of the metropolis spring magic-like into life as if touched by a fairy wand? Similarly the early morning view of Edinburgh from the castle walls, or London from the golden gallery at Saint Paul's, or Paris from the Eiffel Tower, will abundantly repay the enthusiast who, reading what follows, will intelligently attempt their portrayal by photography.

In all photography of this sort, where we work at a considerable height above Difficulties the ground level, the conditions which perplex are very much alike in town and country, from a fixed base or from a free balloon. The chief difficulties arise from the tendency to over-exposure; vibration of the camera caused by wind or movement; and atmospheric disturbances not always perceived by the eye but plainly apparent in the negative. The first necessity in aërial photography is a readjustment of previous notions and practice. We must realize that we are dealing with direct and not reflected light rays. It is safe to assert that the failure of the great majority of aërial negatives is due to a lack of appreciation of these difficulties and especially the tendency to over-exposure.

Preventives are more efficacious than remedies. To avoid over-exposure, it Remedies is easy to remember that the greater the elevation the shorter must be the exposure. simply controlled by reducing the aperture or diaphragm of the lens employed and by the use of a really reliable exposure shutter. Vibration can be overcome by rigidity in the camera and its attachments, with extreme care in its manipulation at the moment of exposure. Atmospheric difficulties must be dealt with as they arise, but much can be done by not attempting to work under unfavorable conditions where there is choice of time. The best time to make aërial photographs is immediately after a protracted period of rain, when the atmosphere is usually as clear as crystal, and early in the morning, or late in the afternoon, when the air is still and the sun casts long shadows. The blue haze which often intervenes between subject and lens, although slight to the eye, seriously affects the sensitive plate and gives poor, flat negatives with im-



APPROACH TO BROOKLYN BRIDGE From dome of "World" Building, New York W. N. Jennings



MARKET STREET, PHILADELPHIA
W. N. Jennings

Taken from the tower of the City Hall, showing the advantage of a long-focus lens in photographing from high buildings. The view includes 1/4 miles. Lens: single combination of Collinear—23 in, focal length; stop f(16); exposure 1 second; day cloudy. Plate: Cramer Crown. Street cars all standing.

perfect definition of distant details. A light yellow screen in front of or behind the lens, in combination with an orthochromatic double-coated plate, will cut out this haze and give a brilliant negative with tender half-tones. We see this demonstrated in the bird's-eye view from the Washington monument. In making this negative the lens was "stopped down" to f/32, a yellow screen was used with a Cramer Inst. Iso. plate, and the exposure was $\frac{1}{25}$ second at 9 A. M. in July. For ordinary work from lower altitudes, as from high buildings, a slower plate, such as Cramer Banner or Seed 23, is advised, the screen being omitted unless the air is hazy and the lens "stopped" to f/16 under fair conditions of illumination.

No special camera is essential to success, and the reader may make his first Camera attempts with whatever instrument he has at hand, provided that it is reliable in its movements and is built on "common-sense" lines. For serious work a 6½ x 8½ camera of the folding type is advised; it should have a bellows extension of at least 24 inches, an extensive rising and falling front-board and a generous amount of latitude in the swing-back. A tripod will rarely be found necessary in photographing from buildings, as the camera can usually be placed on a projecting ledge or window-sill. A few wooden wedges and two or three iron clamps will often prove of great service in fixing the instrument to a rigid support in such cases. A double spirit-level of the elbow pattern, screwed into the top of the camera frame, will be found to be invaluable, ensuring, with the swingback, true vertical and horizontal planes in the view. Particular attention should be given to the bellows of the camera and a search made against strong sunlight, for possible pinholes or other defects. If the interior of the bellows can be reinforced with fairly stiff, lighttight material, so much the better.

For all-round work an anastigmat of about 11½ inches focal length is advised. A single element of such a lens is largely used by Mr. Jennings. It calls for a bellows extension of 24 inches, this focal length avoiding abrupt

or unpleasant perspectives and yielding distant detail in a very satisfactory way. We see this demonstrated in the view of Market street, Philadelphia, made from the tower of the City Hall at an elevation of about 500 feet, with a lens of 23 inches focal length. The Ferry House seen in the extreme distance is fully 1½ miles away from the point of view, yet in the original photograph, an 8 x 10-inch, one can discern the hands upon the ferry clock and the perspectives throughout are wholly pleasing.

A telephotographic lens is an extremely useful and desirable addition to the aërial photographer's equipment for bird's-eye views, provided its use and limitations be thoroughly understood. The atmospheric difficulties are, of course, greater with such a lens, but can be largely overcome. The manipulation of the telephotographic lens is fully explained in THE PHOTO-MINIATURE No. 26, and need not be repeated here.

The exposure shutter used by Mr.

Shutter Jennings is the Thornton - Pickard
"roller-blind" variety. This permits
of considerable latitude in exposures, and the range of
speed is easily and perfectly controllable. It has the
further advantage that a single shutter can be quickly
adapted for use with several lenses by means of the
rubber molding fitted to the shutter frame, accommodating lens-tubes of different diameters.

Plates thromatic plates possess special advantages for aërial work. With such plates coated first with a slow and then with a rapid emulsion, all the distant detail secured by careful lenswork can be retained in development and the inevitable over-exposure of the horizon line can be controlled. In circumstances where orthochromatic or double-coated plates are unnecessary or unobtainable, ordinary plates well backed will yield good negatives if given special care in development. Where an extended trip is planned, including negatives from natural elevations, such as Yosemite points, where color and haze may play an important part in the view, it is advisable to obtain a supply of double-coated orthochromatic plates, freshly

coated, either by special order through a dealer or direct from the manufacturer. For work in cities at a comparatively low altitude, as already advised, a plate of medium rapidity, such as the Cramer "Banner" or Seed

23, will be found useful.

The development of aërial negatives Development of demands all the knowledge and skill we Over-exposure possess. If a single-coated plate was employed and the scene was well illuminated, overexposure and the loss of distant detail are chiefly to be guarded against. First the plate is immersed, with constant rocking, in a weak solution of potassium bromide, say 5 per cent solution. This is followed by immersion in a diluted pyro developer weak in alkali, the tray being covered and the plate well rocked for at least two minutes without examination. A momentary glance at this stage will determine whether the plate is over-exposed. If this is the case, development for contrast is the next step indicated. Transfer the plate to another tray containing equal quantities of old and new hydrometol developer, replace the cover of the tray and continue development until the image of the horizon line appears at the back, or glass side of the plate. Too much emphasis cannot be placed on the necessity of keeping the plate covered and shielded from the dark-room light during the whole process of development. The frequent examination of the negative during development is a pernicious habit which robs the photographer of satisfaction in his negatives and simply adds to the prosperity of the plate manufacturer.

The object of the preliminary bath of bromide is to produce a slow and uniform chemical action during development. When employed in combination with a diluted developer and patience, it will give negatives with desirable contrast and gentle gradations even from

plates much over-exposed.

In cases of known under-exposure a different treatment is necessary. A good method is to develop under cover with a normal pyro developer, applied in fresh quantities from time to time until chemical fog appears upon the surface of the plate. Should the negative, so developed, prove too "contrasty," it should be

thoroughly fixed in fresh hypo and given a prolonged washing, then reduced with a weak (2 per cent) solution of ammonium persulphate. The view of the New York post-office from the "World" Building shows a print from a negative so treated.

Beeby's Method ortol, given by Mr. John Beeby in a recent issue of Down-Town Topics, is well suited to under-exposures. I reprint his description of the method. Make up the fol-

lowing stock solutions:

A. Water, cold distilled, 10 ounces; metabisulphite potass, C. P., 35 grains; ortol, 70 grains. B. Water, cold distilled, 10 ounces; carb. potass, ½ ounce; sulph. sodium crystals, 1¾ ounces; bromide potassium, 5-10 grains. For use, take of these stock solutions in one bath, which we will call Number one, the following: I. A solution, 1¾ ounces; B solution, ¼ ounce; water, distilled, 1 ounce. Into another bath, which we will call Number two: 2. B solution, 3 ounces; A solution, ½ ounce; 10 per cent bromide, 20 minims; water, 1 ounce.

"Now proceed to develop the plate. If the exposure has been short place the plate or film in No. 2 bath, allowing development to proceed until the image is almost buried, that is, the surface of the plate dark all over. Don't be worried at the sky or high lights looking dense. Rinse well and place in the fixing bath for at least fifteen minutes or even more, as a well-fixed negative will keep without deterioration better than one which has undergone long washing and short fixing.

"Where over-exposure is feared, place the plate for two or three minutes in Number one bath, drain and

finish in number two as above.

"All short exposures can be developed entirely in the Number two bath, but be sure not to stop development until the plate is of a good dark color on the face, the image being seen right through the film, bearing in mind that it will lose considerably in fixing on account of the lack of density-giving element. This method can also be used with bromide papers (contact or enlargement), but not with gaslight papers.

"The only cause of failure will be stopping development too soon; that can be ascertained only by individual experience."

For negatives made from balloons, or Ferrous plates exposed at high altitudes where Oxalate the view embraces distant open landscape, Mr. Jennings advises the old-fashioned ferrous oxalate developer as giving clear, brilliant negatives, free from veil or fog and slower in its action than the modern developing agents. As many of my readers will lack acquaintance with ferrous oxalate, I give here a reliable formula, vouched for by Mr. T. C. Hepworth after long experience: A. Potassium oxalate, 5 ounces; hot water, 20 ounces. If a milky solution results, let it clear by standing and pour off the clear liquid. B. Warm water, 20 ounces; sulphuric acid, 30 minims (or citric acid, 40 grains); ferrous sulphate, 5 ounces. C. Potassium bromide, 10 per cent solution. For use, add I ounce of B to 4 ounces of A (not vice versa), with from 10 to 50 drops of C, according to the degree of over-exposure anticipated. It should be remembered that ferrous oxalate is an acid developer, in contradistinction to most of our modern developers which are alkaline developers, and it should, therefore, always have a distinctly acid reaction. The trays in which it is used should be free from traces of pyro, hydroquinone or hypo. As an auxiliary developer, mix equal proportions of old and new developer for use as desired. The development of double-coated

Double-coated Plates orthochromatic plates may proceed on the general lines given for over-exposures in a preceding paragraph, except that the developer should be diluted with from two to three times the normal quantity of water and no bromide should be used. The object of diluting the developer is to retard the action of development and so give the developer time to reach that portion of the image which lies in the lower (slow) emulsion coating. It is hardly necessary to add that the prolonged development of orthochromatic plates calls for extreme caution with regard to the amount of light allowed access to the plate. Keep the plate covered during the whole of development and do

not examine it close to the dark-room light oftener than

is absolutely necessary.

With these instructions and a reasonable amount of previous practice, the reader should now be able to get negatives of bird's-eye views, either in town or country, which will give the distant detail and proper value of the picture planes as clearly as shown in the views reproduced herein. His experience along the line discussed and the problems encountered in working at moderate altitudes will also help him to an intelligent grasp of the requirements of balloon and kite photography now to be considered in detail.

Unlike many uses of photography

strenuously developed during recent Photography years, the possibility of obtaining photographic records of observations at high altitudes, by means of balloons, does not seem to have attracted attention during the earliest years of photography. Among old files of photographic journals there are occasional suggestions that cameras and balloons might be combined with advantage in warfare, but I have not been able to ascertain who was the first to make photographs from a balloon, further than a mention in the Photographic News, of 1863, stating that Nadar and Goddard, of Paris, had attempted balloon photography, without success, in 1858. There is no doubt, however, but that the first successful balloon photograph was the view of Boston, made in October, 1860, by Professor Samuel A. King and J. W. Black. This truly remarkable photograph, made on a wet collodion plate, is published for the first time as the frontispiece to this monograph. As a matter of historical interest, I make room here for Professor King's account of the making of this photograph, as published in the Boston Herald of October 16, 1860.

Boston, 1860 "The Late Balloon Photographic Experiment: Mr. King, of the well-known firm of King & Allen, Aëronauts, has furnished us with the following account of his trip in company with Mr. Black, which is attracting so much interest in scientific circles at the present time:

""Messrs. Editors: For some weeks past prepara-

tions have been making for a repetition of our experiment of photographing from a balloon. We had previously made a rather unsuccessful attempt at Providence, in consequence of the sky becoming overcast with clouds before the balloon was ready to ascend, throwing such a shade on the earth that to take instantaneous impressions with any distinctness was impossible. Nevertheless, we accomplished sufficient at that time to convince us that under favorable circumstances we could overcome all difficulties, and finally bring the experiment to a successful result. We determined to persevere, and on Saturday last,—the prospects of a fine day being very flattering - Mr. Black, the eminent photographic artist, of the firm of Black & Batchelder, and I, as on the former occasion, ascended together. First of all we arose 1,200 feet by means of a stout rope attached to a windlass, and, while remaining stationary at this height, succeeded in getting some fine views of

different parts of Boston.

"'But we wished to get more extended views than could be obtained at such a height, and so, after being drawn down and detaching the rope, we ascended in the usual manner. Soon an extensive field was opened to us, and we hoped to be able to secure some of the magnificent scenes which we now scanned. Everything was in readiness, and an attempt was made to take the city that was now sitting so beautifully for her picture. But just at this time we encountered a difficulty which had never before suggested itself. The gas, expanding as the balloon rose, flowed freely from the neck and filled the surrounding atmosphere, penetrating even into the camera, neutralizing the effect of the light and turning the coating on the glass plate to a uniform dark brown color. Several plates were spoiled in this manner before we discovered the cause, by which we lost much very precious time, as we were rapidly drifting away in a southerly direction. Soon after, the balloon reached an altitude above the clouds, which were already quite numerous and gathering fast. For some moments we lost sight of the city and its surroundings, and, when we again descended below the mist, our distance from Boston was too great to make it worth while trying to get any more views of that

locality.

We were nearing the coast in an oblique direction, and as our voyage must of necessity be of short duration, it was necessary that our movements should be very rapid. Mr. Black proved himself to be peculiarly fitted for the object we had undertaken. Entirely absorbed in his manipulations, he worked with a celerity that was truly astonishing, never allowing the novelty of the scene to divert his attention for a moment when there was an opportunity of securing a picture.

"In this way we moved along, sometimes taking views immediately beneath us, and at others bringing into focus objects that were miles away. None of these views were equal to those taken while hovering over the city, for the clouds had now gathered thick in every direction, and an intervening mistiness in the atmosphere prevented the impressions from being clearly

defined.

"'Our last attempt at photographing was just after passing over the village of East Weymouth. Finding it impossible to carry our experiments any farther, the apparatus was secured, the tent dropped, and the baiance of the voyage was devoted to pleasure.

""We descended at quarter past three o'clock, having been up two hours and fifteen minutes, traveling about thirty miles. So ended our experiment. The views we succeeded in taking can be seen at Black &

Batchelders' rooms, 173 Washington street.

"This is only the precursor, no doubt, of numerous other experiments; for no one can look upon these pictures, obtained by aid of the balloon, without being convinced that the time has come when what has been used only for public amusement can be made to subserve some practical end."

SAMUEL A. KING."

Since this remarkable and very successful experiment, many attempts have been made at various times by photographers, under Professor King's directions, to obtain photographs from a balloon, but, notwithstanding the great improvement in lenses, plates, cameras and shutters, no clearer or more satisfactory photographs have



BALLOON VIEW OF PHILADELPHIA SHOWING GIRARD COLLEGE W. N. Jennings



BALLOON VIEW OF PHILADELPHIA WATER-WORKS FROM A POINT ONE MILE HIGH Double-coated Seed plate; lens 23 in. focal length; f/16; 1-100th second W. N. Jennings

yet been made than those taken by Messrs. King and

Black nearly half a century ago.

Before taking up the account of his Glaisher's experiences related by Mr. Jennings, it Experiments may interest the reader to glance over contemporary reports of the attempts at balloon photography made by the late James Glaisher, who was president of the Photographic Society of Great Britain in 1869. I quote from the Photographic News of September, 1862: "In one of Mr. Glaisher's recent and most perilous ascents, in which he obtained a height of nearly six miles, and became insensible, after passing through the clouds he attempted to make a photograph of the scene, but was prevented by the rapid motion of the He says: 'On emerging from the under clouds we came into a flood of light, with a beautiful blue sky without a cloud above us, and a magnificent sea of cloud below, its surface being varied with endless hills, hillocks, mountain chains, and many snow-white masses rising from it. I here tried to take a view with the camera, but we were rising too quickly and revolving too rapidly for me to do so; the flood of light, however, was so great that all I should have needed would have been a momentary exposure, as Dr. Hill Norris had kindly furnished me with extremely sensitive dry collodion plates for the purpose."

Of an ascent made during the early summer of 1863 Mr. Glaisher writes: "We left the earth at I hour, 3 minutes, P. M.; at I hour, 7 minutes we were at the height of 2,000 feet; at I hour, 15 minutes we passed above 8,000 feet; a height of 10,000 feet was reached at I hour, 17 minutes; in nine minutes afterward we were 15,000 feet from the earth, and rose gradually to about four miles and a quarter at I hour, 55 minutes. On descending, at 2 hours, 8 minutes we were 20,000 feet from the earth; at 2 hours, 13 minutes, above 15,000 feet; at 2 hours, 17 minutes, 10,000 feet; at 2 hours, 22 minutes, 5,000 feet, and on the ground at

2 hours, 28 minutes.

"I could not use the large spectroscope at all throughout the journey, and, through the thick atmosphere and large amount of vapor, I was unable to make any use of the camera kindly prepared by Mr. Melhuish, with plates specially prepared by Dr. Hill Norris, of Birmingham. This ascent must rank among the most extraordinary ever made; the results were most unexpected. We met with at least three distinct layers of clouds in ascending, of different thicknesses, reaching up to four miles high; when here the atmosphere, instead of being bright and clear, as it had always been in preceding ascents, was thick and misty; but perhaps the most extraordinary and unexpected result in the month of June was meeting with snow and crystals of ice floating in the atmosphere at the height of three miles, and of nearly one mile in thickness.'

Woodbury
1881
The obvious disadvantages of being
obliged to send an aëronant and a photographer aloft, and the corresponding diffi-

culty of providing balloons large enough to carry these, led several experimenters to investigate the possibility of sending a camera alone up into the air, the exposures being made by devices operated from terra firma. 1881 the late W. B. Woodbury invented and patented a small balloon camera of this kind, which is at present, I believe, in the possession of Mr. A. L. Henderson, of London. This camera, with the necessary apparatus and four prepared plates, weighed twelve pounds. Just above the lens, attached to a slide which could be drawn out, was a revolving disc worked by a spring giving four or more revolutions-one each time the catch was released-by means of a small electro-magnet; in the upper part of the camera was a drum holding four plates. This also had a spring, causing it to be revolved each time it was released one quarter its circumference, thus bringing a new plate into position for exposure. The camera was suspended vertically beneath the balloon. The lens was covered with an instantaneous shutter, opening and closing the lens in the 21/20 part of a second. This also was controlled by a small electro-magnet. The wires connected with these two magnets, and one for the return current was inclosed in the rope that held the balloon, so that the operator at the base, by simply sending a current through these wires, could work the movements of the

camera as easily as if it were in his own hands. The operation was this: he touched one button and sent a current to one electro-magnet, which brought a plate into position. By means of a telescope the behavior of the balloon could be seen. Directly it was in a steady posi. a current was sent, by pressing another button, throughe second electro-magnet; this released the shuttered id the exposure was made. When the four plates had been exposed the camera was drawn to the ground, the plates developed into negatives, and by means of a magic lantern their image was thrown upon a screen or large piece of paper.

Notwithstanding, however, the possibility of taking pictures from a height in the $\frac{1}{1000}$ part of a second, it was absolutely necessary that the balloon should be perfectly steady. This at first was not the case, until the swinging movement was overcome, viz: a swinging movement in the direction of the wind, parallel to the surface of the earth. This was at length overcome by Woodbury, but I cannot learn of any successful photo-

graphs made with his camera.

The name of Cecil V. Shadbolt is a Shadbolt notable one in the British annals of aëro-1882 nautics. Mr. Shadbolt devoted considerable attention to the photographic possibilities of the field, and the account of his first experiments with the camera in mid-air are decidedly interesting.

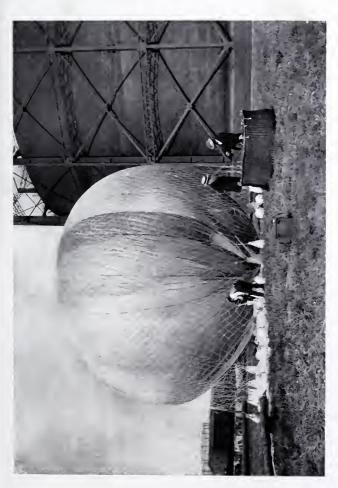
from the British Journal of Photography, 1882:
A good deal having lately been said and written with reference to the subject of balloon photography many suggestions made and elaborate devices brought forward but never used, with a view of obtaining satisfactory map pictures of the earth—the relation of my experiences with reference to an aërial journey lately undertaken in the interests of photography may not be without interest to some of the readers of this Fournal.

I may, perhaps, be allowed here to state that up to the time of undertaking the trip in question it had never been my good fortune to meet with any satisfactory photograph from a balloon, and, having a decided preference for practical results rather than for any amount of theory, I had long cherished the idea of making an ascent, accom-

panied by my camera.

Having completed the necessary arran rements, bank holiday last found me at Alexandra Palac in readiness the "Relito accompany Mr. Barker in his ascent ance." The necessarily lengthy operation of taking in something like 30,000 cubic feet of gas was to found all the more so in consequence of the supply bein vided between two balloons; for there was to be a face—an exciting one, perhaps-but as to which came off victorious I never had the curiosity to inquire. After considerable suspense I was at last assured that all was ready, and invited to take my place in the car. Having complied with this invitation, a few moments only sufficed to secure the camera in its place by means of an arrangement I had rigged up in order to enable the instrument to be fixed at any desired angle from the side of the car. This being done, the only remaining tie which held us to the earth was slipped, and the balloon - the rising power of which had been calculated to a nicety and accurately balanced with sufficient ballast to insure a steady ascent - moved gently onward in its upward course. Diving my head under the focusing cloth, and getting the camera into position as well as could be done under the circumstances, I took a hasty "shot" at the multitude of upturned faces; but this plate, on development, unfortunately turned out to be a failure in consequence of the movement of the balloon, which had only just been released from its moorings.

Gradually and steadily the earth appeared to recede from us, while our aërial "craft" seemed to hang motionless in space, and in a few minutes we were almost directly over Hornsey station of the Great Northern railway. A curious cracking sensation in the ears was experienced, by which I judged that we were making satisfactory progress. Here another plate was exposed. My third and most successful "shot" was taken shortly afterward, when just over the district of Stamford Hill, at which point the barometer recorded an altitude of 2,000 feet. In the resulting picture the streets, railways and houses below are clearly distinguishable. In this view, also, can be seen the vehicles beneath, while



Professor Samuel A. King and W. N. Jennings talking over "space and weight" problem before making a twenty-hour day-and-night journey over New Jersey. This gives an idea of the height and size of the balloon basket



"SNAP-SHOT" OF JERSEY LANDSCAPE FROM BALLOON
W. N. Jennings
Taken at sunset: (16; shutter speed, 1-touth second

people walking on the pathways, although almost too small to be recognizable, are nevertheless to be dis-

tinguished.

Shortly after making this exposure the aërostat gradually fell, until at something under 1,600 feet its downward course was arrested by the expenditure of a few pounds of ballast, and we again began to climb upward until an elevation of 3,000 feet was reached. At about this altitude we remained for some time, and one or two more plates were exposed. The view here was grand beyond description. A lovely panorama of country lay beneath us, including the greater portion of London with its winding Thames, St. Paul's Cathedral being just distinguishable from the surrounding mass of buildings far away down in the distance.

I experienced a strong desire to go higher, and, after having expressed a few very broad hints to that effect, our accommodating captain, although seemingly very loth to part with more ballast than was really necessary, was at length induced to send over the greater part of the contents of another bag. Small pieces of paper thrown from the car streamed away beneath us, and the hands of the barometer advanced steadily over the scale until 5,000 feet were recorded. The seats had purposely been left behind in order to place all the available space at my disposal for conducting operations; but I found a fairly comfortable position was to be obtained on the edge of the basket, of which I availed myself. The balloon seemed to be hanging motionless in the air, the only apparent movement being that of the earth gliding past us-caused, in reality, by the motion of our "craft." Tearing off a sheet from a newspaper, I scrunched it up into as solid a ball as possible. Requesting Mr. Barker to keep his eye on his watch while I kept mine on the paper, I threw it out into space, and watched it in its downward course for a minute and a half, at the end of which time, although not having reached terra firma, it was lost to sight.

It was now past five o'clock P. M., or a little more than one hour after we had started. At this altitude the view was considerably less extensive, in consequence of the intervening clouds obscuring the horizon; but straight down beneath us all was clear, and sunshine could be seen on the earth below. After we had contemplated for some time the lovely prospect around us, Mr. Barker suggested that if I had quite finished my experiments it was about time we were thinking of descending. I felt sorry at the very idea, but having one more plate remaining I exposed it, and then, taking in my camera, sat down on the ballast bags and

began to pack up.

I had taken the precaution to provide myself with a couple of newspapers with which to pack the apparatus tightly in its case, so as to make the whole sufficiently solid to resist any shock we might experience in the descent; but, happening to glance over the side of the car, I was horrified to see the various objects upon the earth growing larger and larger with unpleasant rapid-The grapnel was over, seeking for something in which to bury its flukes; and barely had I time to place the camera in its case, much less to attend to the contemplated packing with newspapers, when the word was given to "hold on tight!" Circumstances made me acquiesce pretty promptly with this request, and the next moment we experienced a bump which brought the hoop of the balloon down over our heads. Another rise, a drag of the grapnel, and one more catch of the same, together with a second bump, and we were safe, camera and all, without a scratch. On inquiry we found we had descended at Ilford, in Essex, some fourteen miles from our starting point; and thus ended one of the most enjoyable journeys it has ever been my good fortune to accomplish.

Altogether, the day was most favorable in every respect for photographic work. It may, perhaps, be of interest to state that the exposures were all made by the aid of an ordinary flap shutter, and were, consequently, of long duration—probably from a quarter to half a second. The plates used on the occasion were Wratten's extra sensitive, and my lens was one of Ross' rapid symmetricals. I am hoping to follow up the present success by making further experiments in the same direction; but, to insure similar results under

less favorable circumstances, it is pretty evident to me that a plate of much greater rapidity will be required, so as to be able to work with a considerably shorter exposure or reduced lens apertures.

So much for past performances. With the knowledge of years the aëronaut of today is better equipped and can handle his balloon with more certainty. The evolution of photographic apparatus and processes has given the aërial photographer equal advantage, so that today there is comparatively little personal risk and much greater chance of success than was possible twenty years ago. Thus, Professor King, of Philadelphia, has made over five hundred celestial journeys without serious accident, and today is as enthusiastic as ever. Similarly, Mr. Auguste Gaudron, of London, has made more than twelve hundred successful ascents. Let us see what Mr. Jennings has to say about photography from the modern balloon.

Practical Work

Work

Work

W. A. Eddy and described hereafter, the lack of control of the direction of the lens and the limitation in size of plate carried, peculiar to this method, makes it apparent that, at present, the balloon, either captive or free, offers the best means of obtaining extensive views of any desired section of country or locality.

All the photographer needs is a clear day, a good hand-camera, and a steady hand to hold it, a supply of double-coated orthochromatic plates, and, of course, a balloon with an experienced aëronaut in charge of the craft. In still air the balloon may be allowed to rise to any height, say 1,000 feet, and held captive by means of a rope while the desired views are obtained.

Thousands of photographs were taken from captive balloons in Paris last summer with a very small percentage of success. Aside from over-exposure, failure arises chiefly from the rapid vibration of the retaining rope, a between-the-lens shutter in such a case being useless; the quickest speed of a roller-blind, next-to-the-plate shutter, becoming essential.

When we approached Professor King, four years ago, with a request that we be given an opportunity to take a few snapshots from the clouds, he gave scant encouragement to the undertaking.

"During the past thirty years," he said, "I have had at least a score of photographers try to take photographs from my balloons, but so far I have failed to re-

ceive any of the promised results."

"I do not think the modern dry plate is adapted to view-taking at high altitudes," was his concluding remark.

Upon examining the original wet plate photographs of Messrs. King and Black, the reason for failure when using the modern dry plate was easily accounted for. The quickest shutter speed under such conditions, where all the light of the sky floods the landscape, is far too slow for a wide-open lens and "instantaneous" plate, and the remedy was simple: The employment of a stopped-down lens, a slower emulsion, or an orthochromatic plate and yellow color screen to cut out the blue haze.

Experimental exposures at widely divergent points under varying conditions of height and light, with carefully recorded results, gave me confidence in being able to obtain good balloon photographs when the

desired opportunity should arrive.

"Everything comes to him who waits," even a pilgrimage among the stars, and, although our baggage was limited to 61/2 x 81/2 outfit and four plates, we were fortunate in all our exposures, securing four negatives having all the qualities of a rich steel engraving, producing 24 x 36 enlargements without a fuzzy line.

There is nothing simpler than taking snapshots from

a balloon.

The camera is held in the hands, not resting on the edge of the wicker basket, the lens is set at a fixed distant focus before leaving the ground and firmly locked at that point.

A steady hand is essential, no palpitation of the heart, and thoughts focused upon the work to be done, forgetful of the fact that you are a long way from home in a new direction. The rest is just like fishing.



BALLOON VIEW OF PHILADELPHIA FROM A POINT ABOUT ONE MILE HIGH July 4, 6.30 P. M.; double-coated plate; lens 23 in. focal length; f/16; 1-100th second Copyrighted 1893 by W. N. Jennings



VIEW FROM A FREE BALLOON ABOVE FAIRMOUNT PARK, PHILADELPHIA Note the ripples pushing ahead of the white steamer. Balloon about 1,000 feet high W. N. Jennings

You will be surprised to note that the The Sensastarting point has vanished, although tions of a First you are quite sure the balloon has never Ascent There is not the slightest senmoved. sation of motion on the part of the balloon or camera, but the landscape underneath appears to be slowly revolving. All you have to do is to keep the lens directed downward at the desired angle and wait until the required view "composes" itself, and the rest is dependent on the presence of mind, skill and quickness of the photographer.

The importance of skilful manipulation of one's apparatus and the avoid-Vibration ance of unnecessary movement or vibration cannot be overestimated. Much of our success was due to Professor King, who is a practical photographer as well as an experienced aëronaut. He realized that the least vibration of the balloon basket at the moment of exposure would mean "doubling" of the image; so he requested our fellow passengers to remain perfectly still and cease breathing for a brief period during the exposure.

So perfectly poised is a balloon that so slight a cause

as a breath of air will disturb its equilibrium.

Having included the entire grounds of the Girard College (about a mile below) within range, and pressed the button, the City Hall, now plainly in view, was next selected. We stooped to change the plate and a moment afterward pointed the lens in the same direction as before, only to find that the City Hall had van-Professor King, noting our astonishment, roadly. "Keep your camera pointing in that ished. smiled broadly. direction," he said, "and William Penn will be around again in a few moments," and sure enough the rim of Penn's Quaker hat came gliding from under the edge of the basket. Soon the first Governor of Pennsylvania stood just where we wanted him, and the shutter clicked.

It was on July 4, at half past six P. M., An Exthat we made our first ascension. The posure light was yellow, the air wonderfully clear and the shadows long, giving the necessary relief to the landscape, - all favorable to our purpose.

If it had not been for the previous practice we should certainly have slowed the speed of the shutter and opened up the lens diaphragm to allow for the color of the light and lateness of the hour; but, fortunately, we followed our predetermined rule, and stopped the Beck (old-style) lens down to f/16, adjusted speed of shutter to $\frac{1}{100}$ second and used double-coated Seed plates with complete success.

Upon the application of a normal pyro developer to the first exposure the image The Negative flashed up and fogged over the plate. which was quickly transferred to a tray containing old hydro-metol developer. The plate was developed in total darkness for about fifteen minutes. After fixing, the negative had all the appearance of a sheet of ferrotype metal. Without washing, the plate was placed in a very weak solution of ferricyanide of potassium (in daylight, of course), and carefully watched from time to time, the tray being kept in constant motion. Presently traces of the image appeared and the reduction continued until we secured an excellent negative. period of ten years this negative is exactly as free from color as it was when taken from the final washing bath.

The remaining three plates were developed with weak ferrous oxalate (no bromide) and the developing action continued until the flattening over of the high-light on the surface coating was caught up and corrected by the emulsion next to the glass. In cases of known over-exposure ferrous oxalate developer is invaluable.

Upon this same voyage we made several exposures with a 4 x 5 kodak, and although the shutter was set to its quickest speed, and a small stop used, most of the exposures were over-timed, although taken at sunset. (Note the long shadows in the view of a Jersey landscape, among our illustrations.)

Upon a subsequent trip to the other side of cloudland we made the mistake of taking aloft a camera of the reflex variety. This kind of camera is all right for ground work, but it is as ill-adapted to balloon photography as a phonograph would be in a boiler factory. In the first place, in order to direct the lens down-

ward and see the image on the focusing finder, it is necessary to lean so far out of the balloon basket as to render a multiple somersault of camerist and camera quite probable.

The second weak point is found in the fact that the necessary declination of the front of the camera makes the reflecting mirror swing forward, blurring the reflected image, cutting off the view and fogging the plate.

A third defect is the absence of a swing-back, and

the consequent distortion of vertical lines.

Trouble number four: It is necessary to press a lever in order to lift the reflecting mirror, which then releases the roller-blind shutter. Upon solid ground this movement may not seriously affect the resulting snapshot, but, up aloft, the slightest motion immediately prior to

releasing the shutter may result in failure.

In addition to these complications there are too many things to remember in operating cameras of the reflex type in balloons: Setting the speed-scale; adjusting the width of the curtain-shutter slit; winding the shutter spring; focusing and releasing the shutter, with the constant worry that something will go wrong at the critical moment. When working in mid-air one's mind should be perfectly free and concentrated on the work in hand, any distraction tending to increase the chances of failure. The apparatus, therefore, should be as simple as possible and almost automatic in its movements. With such a camera and the information here given the capable photographer can look forward to an aërial trip confident of success.

Photography from Kites

Kites

During the last few years much attention has been given to the development of the kite for observation purposes in meteorology and kindred sciences. The object here is to enable the operator to maintain self-

object here is to enable the operator to maintain selfregistering instruments for a considerable period at great elevations. The usefulness of kites so designed for photographic purposes is self-evident, and experiments in this direction have occupied scientists for some years.

The honor of making the first kite photographs in mid-air is usually credited to two experimenters, Archi-

bald, of England, and Batut, of France, who began work in 1886. Both workers succeeded in obtaining map-like views, the lens being pointed straight downward. Archibald suspended his camera from the kitestring, using a system of tandem kite-flying; viz., he attached one kite by its main flying line to the back of another kite. Batut used one kite, and this limited his range, because a single kite of given weight will not fly in light and heavy winds. With the single kite the camera is always liable to disaster from sudden gusts of wind

or similar contingencies. A brief description of M. Batut's kite Batut's is available and may interest the reader. Kite In order to secure steadiness M. Batut uses a lozenge-shaped kite, provided with a long tail. To the kite is attached a small photographic camera by means of a triangular support fixed to the back-bone. The camera is provided with an instantaneous shutter actuated by means of a slow match. Before flying the kite this match is lighted, and when combustion has proceeded so far as to set fire to a small thread, it releases the spring of the shutter, and the exposure is made. Another very novel feature of this ingenious apparatus is the use of a registering aneroid barometer attached to the kite, so that the operator can find out the altitude which the kite has ascended above the ground. barometer is combined with a photographic registering apparatus, which operates at the same time as the camera. It is enclosed in a light-tight box, and the ir stant that the shutter of the photographic camera is released, and the exposure made, an aperture closed by the shutter is uncovered through the burning of a match. At the moment the aperture is uncovered, the luminous rays strike the dial to print the shadows of the two needles (mechanism and index needles) upon a piece of sensitized paper with which the dial is provided. To the thread attached to the shutter, and which gives the exposure when burnt, is fixed a piece of paper, which at the same time detaches itself and falls to the ground, indicating to the operator that the exposure has been made. The kite is then hauled in and the plate developed.



BIRD'S-EYE VIEW FROM TOP OF WASHINGTON MONUMENT, SHOWING CAPITOL, ETC. Cramer Inst. Iso plate; light yellow screen; lens 23 in.; f/16; 1-25th second W. N. Jennings



NEW YORK POST OFFICE FROM TOP OF "WORLD" BUILDING W. N. Jonnings



KITE PHOTOGRAPH OF CAPITOL AT WASHINGTON, D. C. William A, Eddy



View from a kite-sustained camera suspended above American Tract Society Building, New York, showing the singular prospectives given by a vertical down slant.

William A. Eddy

The Work of W. A. Eddy

Most wholly due to the enthusiasm and skill of Mr. W. A. Eddy, of Bayonne, N. J., whose work has proved of inestimable value to the United States Weather Bureau and the War Department. Mr. Eddy sends me

the following report of his experiments:

After the work of Archibald and Batut, above mentioned, Wenz, of Rheims, took photographs by means of a kite in 1890, and he was the first to take perspective views by this method, although the slant of his camera was very steep. By the work of these early experimenters it was made clear that the science of kite-flying would make little progress unless a superior kite and better system of kite-flying were developed. The European kite photographers had been hampered by bad kite-flying and its attendant danger to the camera, as well as by the deficiencies of photography at that time.

In 1895 I bought one of the earlier types of kodaks having a film 3½ x 3½ inches in diameter, known as the Bullet Camera, and, on May 30 of that year, I took the first photograph from a kite in the Western Hemisphere, using a dropping weight and a burning timed slow-

match to release the weight.

Since that time I have probably taken the largest number of kite photographs in the world, in the following locations in the order named: Bayonne, N. J.; Blue Hill Observatory, near Boston; Portland, Maine; Boston, Mass.; Elmont, L. I.; Philadelphia, Pa.; New York City; simultaneous snapshots with three cameras at once, State Camp, Peekskill, N. Y.; State Camp, Sea Girt, N. J.; Washington, D. C.; Reading, Pa., and Statue of Liberty, New York Harbor.

Steadying the Kite I very early found that a dropping weight released by a slow match, as a means of springing the shutter, resulted in blurred pictures, and I soon discovered that a steady pull exerted from the ground below by means of a very thin string keadied the camera at the moment of

exposure.

In the early pictures the pull of a lever, forced downward, pressed the button; in the latter a perpendicular lever was pulled by means of a wire; in either case the pull at the earth exerted by hand was very gradual, as this steadied the camera. After each picture, which is taken by pulling the very thin camera string, the camera and kites, still flying, are pulled down to the earth, but the camera is braced into the main cable so far below the kites that when the camera is at the earth and being set for another picture, enough line is still out to enable the kites still to fly without danger from sluggish earth currents. I have in this way made as many as thirty-two exposures in one day.

The Camera is put into an enclosing box, the rear of which can be raised and lowered along a sliding slot set by a set screw. It is attached to a round table, which can be made to revolve and which can be set at any horizontal radial angle. The result is that before the camera is attached to the main cable it can be made to point downward at any slant, or to point in any direction. It is easy, after practice, to determine before the camera leaves the earth as to what direction it will point when aloft, allowing to variation due to the side-swinging of the kites.

The camera and its enclosing box are fastened to a light wooden T frame which allows only side-swinging in one direction, and this swing is further reduced by the retarding pull of the camera line. This T is attached to the kite cable at two points about eight feet apart, but the T frame is supported by three fastenings in a horizontal position, one at the end of the boom of the

T, and two at the ends of the cross-bar.

Several Kites Required I have as yet taken no kite photographs with a single kite. It requires from six to nine kites seven and nine feet in diameter and a pull of from thirty to sixty pounds to lift the camera and frame to a height of 1,000 feet. It is an undoubted fact that one nine-foot kite would take beautiful pictures with a camera having a film two inches in diameter, but the risk of loss would be much greater than with a tandem line.

Archibald's system of tandem flying. Strain fastening one kite to the back of another, is not recommended, because the upper kite restricts the motion of the lower kites and interferes with their lifting force. A spring balance should be used to see that the strain on the line does not exceed 25 per cent of the strain at which the line actually breaks. Known weights can be loaded upon a single line until it breaks, and in this way the breaking strain can be determined. This is very important, since an attempt to reach a considerable height with a two-pound camera always involves a delicate question of how much strain the line will stand. When the camera refuses to rise to an appreciable height-say 1,500 feet-with steel wire and a steam-engine to reel in the wire, a height of 16,000 feet, or three miles, may be reached. Weight is a serious matter with kites, because the weight of the camera to be lifted is multiplied by fifteen, at considerable height, say 2,000 feet.

Balloons and Kites Compared Compared The distinguishing characteristic of kite photography as compared with photography from balloons is the lower altitude of the camera and the extensive

horizontal view thereby secured.

I soon found that, if I permitted my aërial camera to ascend too high, the smoke of the city tended to dim the picture. It is better in kite photography to keep the camera within 500 or 600 feet from the city's roofs, because the discernible detail from a small camera is thereby greatly increased, making the picture much more interesting.

Kite photography does not enter the same field as balloon photography, because in the former we send the camera only just high enough to get varied perspective

and near-by views.

When no skyscrapers are near at hand, vast stretches of suburban landscape can be photographed from a moderate height, say, a few hundred feet. Some of these outlooks taken in the country are extremely beautiful, especially when the landscape is varied by an arm of the sea, or a river. Every one knows how effective a view in the Catskills may be, especially if it is a

country river village, viewed from one of the high foothills of the mountains. In the cities we have views from the tops of tall buildings overlooking roofs, yet the kite camera enables us to look down upon the roofs of the tallest buildings and to give a complete aërial view with no object breaking the sky-line, without much expense, and, day after day, the kite views may be varied widely.

One of the difficulties of kite photography is that of aiming the camera in any desired direction. In the present pioneer stage of kite photography, the camera must be operated without looking at the finder, and before it leaves the city's roof spaces. The picture is taken by the pull of a special string which is distinct from the kite string. This special camera string is very thin, like

thread, to avoid the pressure of the air against it, which tends to snap the camera shutter prematurely.

One of the unexpected obstacles which I have encountered in kite photography in cities is that due to vertical air currents which rush up the perpendicular walls of high buildings, carrying the kites and camera vertically overhead, where the kite refuses to pull with sufficient force to properly support the camera. Since the camera is hauled down after each snapshot, and reset with a new film for the next paying out of the kites and camera, it often happens that when there is a sudden calm it is necessary to take the picture before it again reaches the roof, and when it is within an undesirably short distance of the object aimed at.

Kite photography is useful in cases where a variety of views is desired of one scene. Of course, with a released balloon the scene changes rapidly with the progress of the balloon; so that twenty-four snapshots of one building or scene can be taken only from a captive

balloon.

Owing to the difficulty and danger involved in lifting weights by means of kites, the kite camera at present is relatively small, photographs exceeding four inches in diameter involving great danger of a break in the kite line, as well as a decided decrease in the altitude of the camera due to excess of weight, a small weight causing a heavy strain on the line.



BIRD'S-EYE VIEW OF WASHINGTON, D. C., FROM TOP OF WASHINGTON MONUMENT Inst. Iso, Plate; yellow screen; f/32; 25th second; 9 A. M., July W. N. Jennings



BIRD'S-EYE VIEW OF WASHINGTON, D. C., FROM THE TOP OF THE WASHINGTON MONUMENT Corcoran Art Gallery, Army and Navy Building and White House in the view W. N. Jennings

During the Spanish-American war, Mr. Eddy's kites were sent to Porto Rico by General Greely, and proved a valuable auxiliary to the broader range of balloon photography with its larger cameras and greater altitudes.

Here our survey of aërial photography must end, as we have exhausted the available information concerning the subject. With the exception of a series of papers by the Rev. J. M. Bacon, published in *Photography* (London, April 11, 18, 25, and May 2, 1893), this is the first separate work for English readers dealing with photography from balloons or kites. Mr. Bacon's papers deal particularly with atmospheric conditions in photography from balloons, rather than with photographic manipulation. They are profusely illustrated and, as a valuable contribution to the scanty literature of the subject, should be seen by the interested reader.

BOOKS

La Photographie Aérienne par cerf-volant. By A. Batut. Paris. 1890. Gauthier-Villars.

La Photographie en Ballon. By H. Meyer-Heine. Paris. 1899.

Telephotography (THE PHOTO-MINIATURE No. 26). New York. 1901. 25 cents.

Elementary Telephotography. By E. Marriage. 117 pages. Illustrated. London. 1901. \$1.75.

Practical Notes on Telephotography. By R. & J. Beck. An illustrated pocket-book of about 50 pages. London. 1901. 25 cents.

Potes

American photographers are nothing if not versatile. We have known them combine, with apparent happiness and success, photography, dentistry and the undertaker's profession all under the same roof. latest example of this versatility is altogether different, and reflects no small honor upon the craft. In July, 1901, a resolution was passed by the Rhode Island Society of the Cincinnati, offering a gold medal for a suitable tune to be sung to the words of Smith's anthem, "My Country, 'tis of Thee." The idea underlying this offer was the admitted unsuitability of the tune of "God Save the King" being used for the national anthem of a republic which had its origin in a revolution against monarchial government. mittee was appointed by the Society of the Cincinnati. which had the advice and cooperation of five prominent members of the musical profession, and some five hundred and seventeen manuscripts were sent in and examined. It should be explained that the committee reserved the right to return all the competing manuscripts if none was found to be suitable or acceptable for the purpose in view. After exhaustive tests, the medal was finally awarded to Mr. Arthur Edward Johnstone, of New York, and the composition will soon be published broadcast. Mr. Johnstone has the further distinction of being the first subscriber on record to THE PHOTO-MINIATURE, and is an expert in photography and cinematography (or biographic) methods of photography, to the study of which he has devoted Our felicitations are offered to every one some years. concerned herein, and more especially to our co-worker, Mr. Arthur Edward Johnstone, whose genius brings this honor to American photography.

A member of the Postal Club directed by that shining light of the Pacific coast, Mr. Fayette J. Clute, tells us that, in the last album of prints received, six out of the thirty prints were Kallitypes and that they were all good prints. Comparing this with a year ago, when the albums of this club contained no Kallitypes, there is evidence of considerable growth in the popularity of Kallitypy. We are fain to believe that the publication of THE PHOTO-MINIATURE No. 47, with the monograph on the Kallitype process by Mr. Henry Hall, is in part responsible for this popularity, in which we have much pleasure.

For some years past the manufacturers of jewelry. pianos, lawn-mowers, soups and pressed beef have recognized the practical advantages offered by photography and the three-color process in the illustration of their catalogues. Hence we are all tolerably familiar with these delicatessen, at least in the colors of art, if not in the colors of nature. Never, until this summer of grace 1903, however, have we been shown in a photographic catalogue the scintillating glories of the No. 3 F. P. Kodak-de-luxe, or the color harmonies of Luxo Flash Compound in the original package, or the "greenery-yellowy" tints of the Ideal Ray-filters in all the glow and color of actuality. In brief, gentle reader, we have at last a photographic catalogue illustrated in colors—as all catalogues of this sort should be illustrated. The expense, of course, is enormous; but the reader gets a vivid impression all the way through, and we know that vivid impressions work havoc in the mind, clearing away vague irresolution and urging the prompt purchase of many things—from the gaudy spinning-tops of youth to the "guaranteed permanent walnut shade" hair-dve of a riper age.

This catalogue—rara avis, prodigy, pioneer, call it what you will—comes from the West, being published by Kirk, Geary & Co., of San Francisco and Sacramento, Cal., as an advertisement of their facilities for supplying the thousand and one things essential to success in photography and photo-mechanical work. It is, in truth, a

very handsome volume of 262 pages, 7 x 10, printed on coated paper, describing and illustrating a remarkable variety of staples and specialties. Apart from the catalogue features and the illustrations in color, the book contains a "Photographic Digest," offering many valuable hints, simplified formulæ and methods. "Digest" might have filled a useful niche in THE PHOTO-MINIATURE series,—to say which bespeaks our opinion of its interest and worth. Readers residing west of Salt Lake City can secure a copy of this catalogue and digest by sending 25 cents to Kirk, Geary & Co., mentioning THE PHOTO-MINIATURE on their request. Those who are so unfortunate as to live east of Salt Lake City are asked to pay \$1 per copy, which simply means that Kirk, Geary & Co. desire to restrict the circulation of their catalogue to their own territory, i. e., from the Rockies to the Pacific coast.

Messrs. Kirk, Geary & Co. deserve the good-will of the photographic trade for their enterprise in the publication of this remarkable list, and a special word of praise is due to Mr. L. D. Hicks for his excellent work

in its compilation and arrangement.

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Gustave Schmidt, of Berlin, is about to publish a pictorial year-book similar to "Photograms of the Year," gotten up in attractive form and edited by Ernest Juhl. The book will be printed on art paper about 10 x 12 inches, and will contain reproductions from selected works by the more prominent photographers of continental Europe. These will be accompanied by critical articles upon the pictures, which critiques will be printed in English, French and German. The price of the work (in Germany) is announced at 5 marks in paper and 6 marks in cloth. American workers interested in this venture may secure copies of the work by sending an international money order for \$2 to Dawbarn & Ward, Ltd., 6 Farringdon Ave., London, E. C., Eng.

Photographs in colors once more: In this country we have many processes of color photography exploited

in the newspapers, but they rarely get as far as practical demonstration. On the other side of the Atlantic these processes are not only exploited in the press but are also demonstrated. The latest process of this sort was recently shown before the London Camera Club. It is known as the Jumeaux-Davidson process, and is somewhat similar to the superimposed stained-film methods, such as are described in THE PHOTO-MINIA-

TURE No. 38.

The promoters of the new process do not pretend that it embodies any new principle. Three negatives are taken under the filtered beams from colored screens, and positives, which are afterward stained to the complimentary colors of the original screens, are put together so as to form a polychromatic picture. It is for the preparation of the positive images that originality is claimed, and the inventors have done well to adapt to the making of these transparencies a material with which photographers are familiar, and which is ready to their They are made from rollable films after the silver has been dissolved out of them by means of hypo. If the system takes on, of course, manufacturers will be ready to supply film coated with a plain solution of gelatine; for it is a wasteful thing to throw silver down the sink, but at present this extravagance must be disregarded. The film, having been thus rendered inert and thoroughly washed, is immersed in a bichromate bath, to render it once more sensitive to light.

In the meantime, a cyanotype image, which is to form the basis of the polychromatic print, is prepared by exposing beneath the negative taken with the red screen a properly sensitised paper. This affords a print of blue-green tone. A piece of the bichromated film is next exposed beneath the negative taken under the blue-violet screen, and is afterward immersed in a bath of yellow dye, and in like manner another piece, exposed beneath the green negative, is stained red. Both these films are allowed to remain in water until those portions which have been unaffected by the light are deprived of their color. The blue print on paper, and the yellow and red prints on film, are now dried, and when dry the red and the blue are immersed in a solution of warm

gelatine and cemented together. When they are dry the celluloid film is stripped off, and the yellow print is fastened by warm gelatine above the other two. When this trichromatic picture is again dry, the celluloid backing of the yellow, or last film attached, is stripped off, and the thing is complete. It is obvious that exposure of the films must be made through the celluloid backing. Dr. Jumeaux, who was the spokesman, demonstrated the whole process, and his lecture aroused much inter-These particulars were taken from The Photographic News of July 31.

French readers are advised that Charles Mendel, 118 Rue d'Assas, Paris, has recently published a little book, "La Photographie au Charbon" (carbon printing), which contains an unusually complete chapter on failures and defects incidental to this printing method.

book is published at 2 francs.

Another useful booklet published by this house is "Les Ennemis du Laboratoire," a digest of articles which have already appeared in the Photo Revue dealing with the peculiar liking shown by flies, cockroaches, beetles and other bugs for the gelatine films of negatives while drying or in storage. The writer seems to have overlooked the fact, which we ourselves have observed, that the American water-bug (locally known as the croton-bug) possesses an unsatiable appetite for the platinum image. We have known a third of a 4 x 5 platinum print to disappear in a single night from this cause. The bugs seem to pick off the top surface of the paper only, thus entirely destroying all vestiges of the image thereon.

A Tilting Tripod Top, by means of which the camera may be tilted at any angle upward or downward, or instantly reversed, for the making of vertical pictures without changing the camera back or removing the camera from the top, has been placed upon the market by the Folmer and Schwing Manufacturing Company of New York. This attachment is exceedingly

neat and compact in form, and its varied possibilities of usefulness should commend it to many classes of photographic workers. It is made in two convenient sizes, designed for use with the Crown Tripod made by the same firm.

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The following correspondence speaks for itself:

EDITOR THE PHOTO - MINIATURE :

Dear Sir.—Mr. Dobbins, the painstaking worker in the field of telephotographic and pinhole photography, has consented to our publishing the following unsolicited letter, wherein he tells how to use the Wynne Meter in pinhole work. We should like your readers to know that we now number all our packets of sensitive paper, and that paper marked as No. 4 on the back of our envelope is slightly faster than usual, and that it is, therefore, advisable to lower each speed number on our Speed List to the one next lower when using this paper, i. e., f/111 to f/90, f/90 to f/78, etc.

Very respectfully yours,
THE INFALLIBLE EXPOSURE METER CO.

THE INFALLIBLE EXPOSURE METER CO.

Gentlemen.—Will you kindly send me, for enclosed fifteen cents, a packet of the new paper? And may I say that, thanks to the articles of Dr. D'Arcy Power in Camera Craft, I have solved the problem of how to use the Wynne Exposure Meter in making pinhole photographs. Simply multiply the number of inches of bellows length by 2 if a No. 8 needle is used; by 3 if No. 10, and by 4 if No. 12, and so on. The result is the f value.

I cannot express to you my appreciation of the Wynne Meter. It is the greatest help in the direction of economy in photography of which I have heard. It has saved me plates, it has saved me costs of journeying, it has saved my patience. I have, I speak sincerely, saved its cost many times over, even in my limited work. Especially in telephotography and similar operations, where the question of accuracy of exposure is of first importance, the meter is invaluable. Indeed, I

think so much of it that I have just bought another one for my son, who is also interested in amateur photography. The new meter is, as scores of tests that I have made have demonstrated, absolutely reliable. These words I send you voluntarily, just from simple grateful appreciation of the meter.

Very faithfully yours, (Rev.) FRANK S. DOBBINS.

A.

In a paper on "Animal Photography" recently read before the Royal Photographic Society, Mr. Walter P. Dando spoke of photographing animals in their cages at the Zoo, and pointed out that if the camera is held sufficiently near to the cages there will be no interference from bars or wire netting. There are photographers who scarcely realize this, but it must be remembered that the lens sees from a rather large area and every portion of the lens which may be uncovered gives a perfect or complete image. Thus it is that if a piece of black paper is attached to the front of the lens, the chief effect is to reduce the light. Indeed. sometimes a central opaque disc is used to diminish spherical aberration, as with some lenses greater intensity can be obtained for a given standard of definition by using the margin than the center.

Mr. Dando also emphasized the view that moderately short exposures are generally better than extremely short exposures, from a tenth of a second to a twentyfifth of a second being quite fast enough for almost all animals, if a time is selected when a minimum of movement is to be expected. He suggested that if amateurs would bear this in mind the present waste of plates would be much reduced, as in the case of "instantaneous" subjects it is probable that more plates are lost by under-exposure than by all other causes put together. It must be remembered, however, that there are exceptional cases of animal portraiture in which exposures must either be very much less than a twenty-fifth of a second, or the alternative of a focal plane shutter must be resorted to. A focal plane shutter which exposes a plate in a tenth of a second may

give a degree of sharpness of a moving object equal to that obtained with an ordinary shutter at a speed of a two-thousandth of a second, if such speed with an ordinary shutter were possible; but this sharpness of some objects may involve an exaggerated blurring of other objects, to say nothing of any question of distortion of general outlines. Thus, if a focal plane shutter having a slit one millimeter wide traverses a plate 100 millimeters wide in one-tenth of a second, the exposure of the plate will be one-tenth of a second, but any stationary point in the scene will receive an exposure of only one-thousandth of a second. A moving point the image of which moves across the plate at the same rate as the slit, and so as to meet the slit, will receive an exposure of a two-thousandth of a second, but if the motion of the point is reversed, so that the image moves with the slit, the exposure of the point will be one-tenth of a second, and the point will be so drawn out or distorted as to form a line across the plate. Thus it is that no one simple statement can completely define the speed of a focal plane shutter.

Among the new things introduced by Burke & James, of Chicago and New York, is a special Ingento Postal Card Outfit, which makes easy the production of pictorial postal cards, such as are now rapidly be-coming popular all over the world. The introduction of this specialty "fills a long-felt want" among amateurs and will no doubt be generously appreciated by those for whom it has been devised.

Another novelty is the Gasolene Vapor Light Lantern. This is a new form of the popular Ideal Lantern introduced by Burke & James some years ago, but is fitted with an ordinary students' lamp. The lantern gives a very clear, strong light, better than oil and quite as desirable as the electric light. It should prove a boon to the many amateurs and professionals who have hitherto lacked a convenient lantern in which oil could be used.

A third specialty offering great convenience to the amateur is the Monogram Film Printing Frame, which does away with nine-tenths of the troubles experienced in printing from roll-films. The frame is a regular professional 5 x 8 in size, but the side bars are pierced with slots extending from end to end. Adjoining these slots are brackets arranged in pairs to support an empty film spool on each side. These brackets are adjustable toward and from each other, so as to hold films of any width up to seven inches. The roll-film is developed in full length, preferably in the Kodak Developing Machine, and rolled up on one of the empty spools attached to the printing frame. The film is now strapped across the frame and is ready for printing, being held under tension by means of the side brackets, and thus held close to the glass.

4

The Fourth Annual Salon of the Chicago Society of Amateur Photographers will be held in the Art Institute, Chicago, Illinois, from December 29 to January 24, inclusive, 1903-4.

The jury of selection will be wholly photographic, and is composed of the following persons: Dr. F. Detlefsen, J. H. Field, Louis A. Lamb, F. Dundas Todd

and Marshall Waite.

All pictures submitted must reach the Art Institute on or before December 15, 1903. The members of the Photo Secession, New York, have promised a loan exhibit.

Full particulars regarding the Salon can be had on application to the Chicago Society of Amateur Photographers, the Art Institute, Chicago.

4

It rarely happens that two partners in a business are permitted to celebrate the semi-centennial anniversary of their association. On this account, we note with great pleasure that J. J. Bausch and Henry Lomb, of Rochester, have recently celebrated the semi-centennial anniversary of their association in business together. The happy event took place on July 24 at the Lyceum Theater, Rochester. We voice the sentiments of our readers everywhere in wishing the Bausch and Lomb

Optical Company still further success in their splendid enterprise.

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Among the novelties shown in the national convention at Indianapolis was a card mount in a new shade known as Photo-Tone, made by Taprell, Loomis & Co., of Chicago. The card is known as the Cardinal and has an effective lace finish, the design being particularly tasteful. The card is being introduced at a

popular price and should win general favor.

Two years ago Messrs. Taprell, Loomis & Co. brought out an olive-brown mount, and this card had an unprecedented sale because of its harmony with many varieties of prints. Like all other popular things, the olive-brown mount became common, and latterly photographers have been adapting lighter colors and rich black cards. The trouble with these is that they are not always harmonious with the prints put upon them, and the public objected to the lighter colors because they soil so easily. The new shade Photo-Tone avoids these difficulties. It is of that rich deep color familiar in a good aristo-platino print, so that when such prints are mounted upon it a very agreeable effect is secured. The Photo-Tone card is also adapted for the mounting of platinotype and development paper prints. Photographers who are looking for something "new under the sun" should ask their stock-dealer to show them the Photo-Tone card.

In the March number of THE PHOTO-MINIATURE, dealing with "Commercial Photography," was published the advertisement of a book entitled "Colors in Photography," announced by S. B. Hargreaves, of Indianapolis. This advertisement was inserted in the regular course of business after we had ascertained that the advertiser was reputable, and that his method was genuine. Since the advertisement appeared we have had several complaints from readers that they could not get any response to inquiries directed to the advertiser. The further inquiries we thereupon made in India-

napolis resulted in unsatisfactory replies, and we have been unable to get into direct communication with Mr. Hargreaves, all our letters being returned through the dead-letter office as unclaimed. We therefore advise our readers to regard the announcement of S. B. Hargreaves as canceled, and not to give themselves any unnecessary trouble in the matter. Apparently the man and the method, like previous men and methods of color photography, are mysteries.

Æ

Messrs. Squires & Bingham, of 138 Escolta, Manila, P. I., advise us that they have admitted to their firm Messrs. C. S. Moody and H. E. Deputy, and will hereafter conduct a wholesale and retail photographic supply business, with the whole of the Philippine Islands as their field. The new firm will be known as Squires, Bingham & Co., and is prepared to undertake all kinds of commercial photography. A complete and comprehensive stock of apparatus and supplies will be carried as heretofore, to meet the requirements of amateur and professional photographers in that part of the world. We take this opportunity to extend our good wishes for the complete success of this enterprising house in its widely scattered field.

-0

James H. McCorkle, with whose experiments in platinotype printing and pinhole photography our readers are familiar, gave an interesting talk upon his hobbies before the Portland (Maine) Camera Club a few days ago. The demonstration of his methods was accompanied by a wall exhibition of prints, which drew forth the enthusiastic praise of those who attended the demonstration. In his address, Mr. McCorkle said that he regarded the camera as the best preventive of gray hairs within his knowledge. Thus he goes on record as the first to advocate photography as a hair-restorer. Whether it is a preventive of the other more serious trouble, baldness, the account does not state. This is sure, that Mr. McCorkle has more enthusiasm and vim than many youngsters who have not seen half

his years, and, knowing him as we do, this bloom of youth may with justice be ascribed in this instance to the joys of photography.

The difficulties attendant upon the choice of a lens for special purposes is one with which all photographers are familiar. The claims of the various manufacturers are so conflicting, and the editor of a photographic magazine naturally hesitates before expressing individual preference in black and white, lest it be quoted to his disadvantage. Those who have need of expert judgment in the selection of a lens will do well to put themselves in touch with the New York Lens Company, a firm which makes a specialty of the scientific testing and choice of objectives in photography. This concern is under the direction of O. H. Peck, a veteran dealer with ripe experience in his business.

Mr. and Mrs. H. Snowden Ward, publishers of The Photogram, London, will arrive in this country late in November for an extended visit. During their stay among us Mr. Ward will lecture upon topics connected with Dickens, his lectures being cleverly illustrated with scenes from the haunts and localities mentioned by Dickens in his works. These lectures have been enthusiastically received in England, and Mr. Ward anticipates an equally successful tour on this side of the Atlantic. Communications from societies desiring these lectures should be addressed to J. Chalmers, at 361 Broadway, New York. Personal letters addressed to Mr. Ward, in care of this magazine, will be given to him on his arrival.

A very neat and attractive catalogue of cameras and supplies is at hand from C. H. Loeber, 15 East 17th street, New York. In addition to the regular lines, this carefully compiled list includes the very newest goods introduced, and the prices are extremely persuasive.

Mr. Loeber is centrally located in New York, and his store is one of the most interesting of its kind in the metropolis. For some years past a specialty has been made of out-of-town and mail-order business, and this splendid catalogue is the outcome of the growth of this department. It is sure to be a convenience to all Mr. Loeber's customers and is well calculated to further his interests. We note with pleasure that in all various departments detailed in the catalogue, the number of THE PHOTO-MINIATURE dealing with that subject is specifically mentioned. Thus, under retouching frames we find "Read THE PHOTO-MINIATURE No. 12: Retouching Negatives and Prints; price 25 cents, postpaid." Mr. Loeber is the first to adopt this commonsense idea of listing the literature of photography with its supplies. A copy of the catalogue can be obtained by sending 5 cents to prepay postage.

4

The best and most interesting sort of advertisement is that which educates or really informs the reader concerning the thing advertised. From this view-point the advertising matter sent out by Taylor, Taylor & Hobson, Ltd., St. James Bldg., New York, is always satisfactory. We have just received from this house a capital little booklet titled, "Concerning Cooke Lenses," written by J. R. Taylor, and attractively illustrated by examples of portraiture, interior, wet-day, marine and landscape photography. The booklet is written in simple terms and offers much useful information. Readers desiring a copy will do well to ask Messrs. Taylor, Taylor & Hobson, Ltd., for this before the edition disappears.

4

The publishers of "Photograms of the Year" announce substantial and desirable improvements in the volume "Photograms of the Year 1903," which is promised for December. American photography is this year to be handled in a thoroughly comprehensive way, the product of separate sections of the country being taken up by competent men in each section. The num-

ber of illustrations reproduced from current American work will also be increased, and the whole book will be printed upon a special coated paper, which will give much better reproductions than those given in some of the early volumes.

The steady increase in popularity of this unique record of the pictorial work of the year in all countries will doubtless be further enhanced by these improvements. We will keep our readers informed as the book ap-

proaches publication.

A.

The Practical Photographer, formerly published by Percy Lund, Humphreys & Co., Bradford, England, has been acquired by Messrs. Hodden & Stoughton, of London, and will be issued in a new form to be known as the Library Series, beginning October 1. The new series will be under the editorship of the Rev. F. C. Lambert, M.A., generally favorably known not only as a frequent exhibitor at the large British exhibitions, but also as the author of many standard English and American text-books on photography, as well as a contributor to the leading photographic journals here and abroad.

The Library Series of the Practical Photographer will be published monthly, at one shilling per copy. American subscriptions will probably be about \$4. The magazine will be 5½ x 8½ inches in size, printed on rough paper from readable type. The reading matter will be entirely original, and the illustrations will, it is said, be produced in a style hitherto unattempted in photographic journalism. Mr. Lambert has our cordial good wishes in this undertaking, which promises a

magazine of unusual interest.

4

Few modern developers have secured so large a measure of favor in a short time as Edinol, introduced by the Bayer House. Particulars of this new product have repeatedly appeared in our pages. Those interested should note that the manufacturers of Edinol have recently introduced the developer in tablet form.

These tablets are said to keep well, dissolve quickly, and furnish a developer which can be used for plates, papers and lantern-slides. It is also announced that hereafter Edinol will be obtainable in quarter- and halfounce packages, sold at 20 and 40 cents respectively, thus enabling any one to experiment with this developer

at a nominal expense.

Another extremely interesting product introduced by the Bayer Company is the Bayer Ruby Varnish, for backing plates to prevent halation, coating electric bulbs, dark-room windows and dark-room lamps to render them non-actinic. The progressive amateur should put himself in touch with the Bayer Company, and thus keep himself informed of the many excellent specialties put on the market by this enterprising firm.



We have news of the organization of the Camera Club of Pittsburg, a society pledged to promote the interests of pictorial photography and to sanction only such work as shows distinct evidences of artistic ability. The object of this society is to hold monthly exhibitions of the members' work and annual exhibitions open to all pictorial photographers. The management of the Camera Club of Pittsburg is entirely in the hands of a board of Trustees, consisting of Lewis F. Stephany, director: Frederic T. Aschman, James B. McClay, Marshall H. Reno, Francis E. Gaither, Oscar C. Reiter and David Rosser. The club will have no rules or by-laws, and the annual dues are \$5, with an initiation fee of \$10, the membership being limited to twenty-five members.

This venture is particularly interesting as the first fruits of the Photo Secession of New York, of which Alfred Stieglitz is the director. The seal of the club includes three linked rings. The gentlemen above mentioned are all earnest workers in pictorial photography, and we wish them success in their adventure.



A series of notable photographic competitions is announced by Kodak, Ltd., of London, in which 404

cash prizes, amounting in value to about \$5,000, are offered for pictures made on Kodak Non-Curling film and Kodoid plates, with a separate competition for negatives developed in the Kodak Developing Machine. By special arrangement these competitions have been opened to admit American work, and the opportunity is one which should not be neglected. A circular giving full particulars can be had from the Eastman Kodak Company, of Rochester, N. Y., from whom our information comes.

In Memoriam Edward L. Wilson

As briefly noticed in our last issue, Edward L. Wilson, editor of Wilson's Photographic Magazine, New

York, died at Vineland, New Jersey, June 23.

For more than a quarter of a century, and in our own times, Edward L. Wilson was one of the most notable figures in American photography; its foremost teacher and publicist; the organizer of its scattered forces; the sturdy champion of its rights and privileges wherever these were questioned. Carey Lea, Vogel, Wharton Simpson, Phipson, Robinson, Rocher, Root, Rulofson, Landy, Sarony, Salomon, Monckhoven, Lacan, the elder Nadar, Luckhardt, Fitzgibbon, Adams, Newton, Wilcox, E. and H. T. Anthony-to name only a few of the honored dead-were his familiars and co-workers. That he accomplished, in his day, more than any other one man for the uplifting and advancement of photography in America, is indisputable. For almost forty years he devoted his whole energy to the helping of all who followed photography as their calling or profession. It is right and just, therefore, that we should make here some record of his work among us, marking, as we turn the pages, the quality of the man and the unselfishness of his life.

Mr. Wilson began his work in photography in the early sixties, entering the service of F. Gutekunst, of Philadelphia. In that association he was brought into contact with the photographers of that time, saw their lack of direction, and quickly realized his vocation. Photography as a profession was then at its lowest ebb, and the whole art in a state of transition. The daguer-rectype process had been shelved as out of date and

new methods were being introduced. Confusion and disorganization were uppermost, the photographic fraternity being harassed on every side by numberless restrictions and abuses. These abuses Mr. Wilson from the beginning set himself to remedy. There was urgent need for a leader to stem the tide of demoralization, to organize the fraternity and inform it as to its rights, a clear head to make a way toward better conditions, and an organ which should shape events toward relieving the profession from its burdens within and without.

Such was the condition of affairs photographic when, in 1864, Mr. Wilson began the publication of The Philadelphia Photographer, now known as Wilson's Photographic Magazine. In this he was well supported by the more prominent of amateur and professional workers, and many men of note, such as Mr. Coleman Sellers, Rev. H. G. Morton, Mr. Shelton McKenzie and M.

Carey Lea, lent their practical aid.

The story of Mr. Wilson's activities during his long service as a journalist being, in fact, the history of American photography from 1864 to the present time. it is impracticable here to present a consecutive record of the many works to which he gave his labor and enthusiasm. It will be interesting, however, to glance at a few of his activities apart from his magazine. In 1866 he began the publication of a year-book of photography, under the title "Photographic Mosaics." Year by year, from 1866 to 1901, when his last illness came upon him, the pages of "Photographic Mosaics" were filled with concise digests of the progress of photography in all its applications. Similar special enterprises were the publication of an illustrated monthly journal, known as The Photographic World (1870-71). and a third monthly journal, The Magic Lantern (1874-1885), the first periodical devoted to this branch of photography. As part of his work in the lantern field, Mr. Wilson published his "Lantern Journeys," three volumes of descriptive notes of people and places, adapted for the preparation of illustrated lectures. To his editorial work throughout, he added the responsibilities of publishing, and at least a score of well-known text-books on photography attest to his discrimination

and enterprise in this field. He was also largely instrumental in popularizing stereoscopic photography in America, the well-known stereoscope invented by the late Oliver Wendell Holmes being first published in During the seventies, Mr. Wilson his magazine. edited and published the first volumes of Photographic Times. Thus, during those years he was the responsible editor of no less than four photographic journals. It is impossible to glance, even casually, over the record of his work without wondering how one man could accomplish so much. This astonishment increases as we reflect that the published record comprises only part of his life-work, much of his time being necessarily given to the work of organization and correspondence. He had an enormous capacity for work, and his various publications will remain as a monument to his indefatigable ability and breadth of mind. A man of high ideals and sterling integrity, he had a lovable personality and possessed in an unusual degree the faculty of attracting the enthusiastic support of those with and for whom he worked during his long life. In this brief record, we have but barely touched the more prominent among his innumerable labors for American photography. To tell of them all and to explain, even briefly, the significance of his labors, would be to rehearse the history of American photography during the last half century. He leaves a gap which will be difficult, indeed, to fill, and his death will be mourned as a personal loss by all who touched his life and work.

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288 pages, 5 x 7½, profusely illustrated with halftones showing comparative results obtained with different lenses and many diagrams in the text, marginal index, etc. Two editions: Red cloth, 75 cents; and de Luxe (a few copies only) in superior binding, with photogravures, etc., \$1.00

This book is different in that it was written and illustrated by two well-known makers of lenses. It covers every point of possible interest in the choice and use of photographic lenses of all kinds for all classes of work. Thus it may be said to contain the essence of all other books on the subject

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Matched edges; colors, Olive-brown and Ascot White, hand-finish surface; white tissue covers to match card, and seal embossed on cover, with silk ribbon.

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We have been experimenting for a long time to get a developer that will produce a negative of the very finest quality yet will not stain the fingers. The result of these experiments is Eastman's Special Developer, a preparation which combines the non-staining quality with properties which produce a clean and crisp negative.

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Develop your negatives with the Daylight Developing Machine instead of the old, stuffy, dark-room way. The Kodak way means better negatives—to say nothing of the comfort.

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A CONFESSION

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The machine contradicts many old theories; upsets a number of time-worn fallacies. It is a part of the creed, for instance, of most old-time photographers that the hypo and the developer must never be used in the same receptacle. It is another that negatives must be given individual treatment in development.

These things he not only believes thoroughly himself but he has preached them to others. He doesn't like to go back on his creed. We don't blame him. We didn't either. Eighteen months ago we believed in these things as thoroughly as he. We have had to own up that we were wrong; have been obliged to re-write parts of a great many of our instruction books to make them in accord with what we have learned from the Kodak Developing Machine.

It was rather hard for some of us to own up that a nickelplated box and a ninety-cent clock could turn out better negatives in a mechanical way than we could turn out by the most careful manipulation and the exercise of our very best judgment. But we had to come to it.

The fact of the matter is that the machine does its work so well that by its aid amateurs of only a few days' experience are making cleaner, better printing negatives than are many of their confreres who have for years been devotees of the dark-room. That is why it is so rapidly succeeding despite the fact that from the start every hand was against it.

To battle with prejudice is a slow fight. To make people unbelieve much that they have believed and take back much that

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they have said is something hard to accomplish. Yet the Kodak Developing Machine is doing this very thing with increasing success. Every machine that gets into use becomes a pioneer which blazes the way for other machines. Soon we will wonder why we ever worked in the old dark way.

If you are not familiar with the machine and its workings, make it a point to attend the first possible demonstration. We own up that we were prejudiced against it and that it took a lot of evidence to set us right. Are you prejudiced, too?

PHOTOGRAPHIC COMPETITIONS

For the benefit of those interested, we will give here, each month, a bulletin of the important photographic contests in progress throughout the United States.

BAUSCH AND LOMB OPTICAL COMPANY, Rochester, N. Y. International competition. \$3,000 in prizes. Closes October, 1903.

C. P. GOERZ OPTICAL WORKS, 52 Union Square, E., New York. Cup competition for professionals. Closes August 1, 1903.

CAMERA PUBLISHING Co., 114 to 120 S. Seventh Street, Philadelphia. Open competiion. \$540 in cash prizes and medals. Six classes. Closes October 5, 1903.

Leslie's Weekly, 110 Fifth Avenue, New York. Weekly competitions, open to amateurs. Prizes, \$10, \$5, \$1.

BUFFALO EXPRESS, Buffalo, N. Y. Continuous contest. Prizes, \$5 to \$25 weekly.

RECREATION, 23 West 24th Street, New York. Eighth annual amateur competition. Forty prizes in photographic and sporting goods. Closes November 30, 1903.

LADIES' HOME JOURNAL, Philadelphia. Pictures of prettily decorated tables. 10 prizes, with a total of \$225. Closes August 1, 1903.

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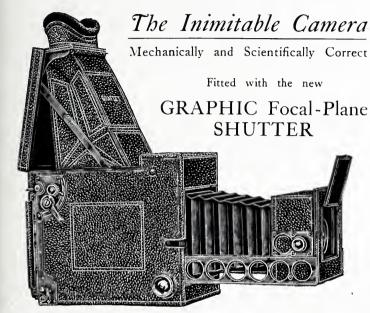
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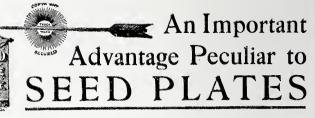
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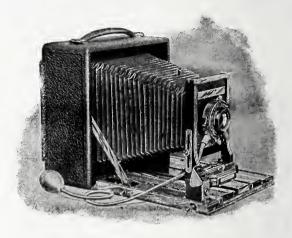
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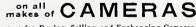
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Number 51

PRESS PHOTOGRAPHY

I suppose the temptation must be very great to all the writers of these monographs to start with the statement, qualified perhaps, but nevertheless dogmatic, that the particular branch of photography of which they write is the most fascinating of all the innumerable applications of camera craft. In justice to the whole science of photography, however, it would seem hardly proper,—to say nothing of being logical,—to make such a claim for any branch of photography which did not include, paradoxical as such a phrase may seem, a majority of photographic ramifications. With this idea for a premise, therefore, there is at least some plausibility in claiming for press photography a scope and interest which few, if any, other branches of the dark art can be truthfully said to possess.

The title of this monograph is, in a large measure, self-explanatory, but it may not be amiss to state in so many words exactly what is meant by press photography. The majority of periodicals published today are illustrated. All the daily papers of any size print illustrations from time to time, and the big Sunday issues are often profusely pictorial—using the word broadly. An unillustrated magazine is as rare today as it was common fifty years ago. Fully 90 per cent of the illustrations in periodicals of all kinds—newspapers, magazines, trade journals and weekly publications—are made from photographs. These photographs are supplied by press photographers in many cases; and press photography, therefore, is the science of making illustrations by photography for the press. Such photographs are obtained

in other ways, however, than by the services of the press photographer. The large journal, which has a photographer, or photographic staff of its own, is more or less independent in the matter of illustrations, but the smaller periodicals are obliged to depend upon the large stock of photographs continually sent in by contributors with manuscript, or upon their files, in which some editors keep on hand, as far as possible, a supply of photographs covering the subjects which make up the general run of the "stories" of their respective publications.

The field of work, therefore, is as World-wide wide as the world itself. To the man Field with the camera, using it as a hobby or a means of pleasure, who has yet a fancy for making his instrument pay for itself and its supplies and perhaps a little over for pocket money, photographing for the press at once commends itself as a field both easy to enter and pleasurable in which to travel. Not to claim too much for the possibilities of the field, however, it may be well to state at the outset, that, no matter how good a chance a press photographer may stand of having photographs accepted in sufficient quantities to make the work remunerative, his brother photographer, who has also some literary ability and can write a story to go with his illustrations, is in far better line to make a success of it. The degree of literary ability needed is not high, nor are the requirements of editors nearly so exacting in this regard as the uninitiated are apt to believe. To tell the story as simply, as concisely, and as clearly as may be done, to cover the field entirely, to give all the facts, and to be, above everything else, prompt, are the main requirements. Graceful phrases. stylish writing and brave description, all very well in their way and place, are not necessary nor desirable in the hands of the man who writes around his photographs. The pleasures of the work are as nu-

Its Pleasures merous as the subjects which the press photographer will be required to take. There is a certain excitement attendant upon an order to get a certain photograph of a certain subject in a certain and often all too limited time, which the man who carries a camera to the country for the making of

views and pictures in a quiet way can never know. There is a fearful pleasure in knowing there must be no failure, regardless of the conditions. For a failure to procure the photograph desired is so seldom forgiven by the man who rules the destinies of the journal from the depths of a revolving chair, that it is unnecessary to contemplate the contingency. There is the pleasure, too. of successfully doing the most difficult work under the most difficult conditions. There is the pleasure of knowing that through your own unaided efforts you have enabled thousands of people to see and understand that which otherwise would have been to them but a hazy fact, locality, accident, whatever the subject may be. Last, but by no means least, there is the pleasure of beating the other fellow by getting on the spot first and getting the photograph for which he tries and fails. Or, if he be equally successful, in finishing in time for your paper's next edition, while he, poor unfortunate, is too late and fails.

Of the profits to be obtained by the pursuit of this branch of photographic work, it may be said that the monetary considerations vary about as widely as the salaries of office boy and bank president. You may work for weeks and barely cover expenses of plates and paper, and you may in a day make a hit which will add a sum to your bank account sufficient to run you for six months and still leave a balance on the right side. A more exact consideration of this important part of the subject will be dealt with near the close of the monograph.

Putting aside, however, all considerations of monetary rewards, there is the profit of experience. The press photographer probably sees more of the world, learns more of his art and has a better understanding of current events than any other variety of newspaper man. Photographically, he runs the entire gamut from a snap-shot in the street to making the most difficult of copies. He meets all sorts and conditions of men, takes an active though unobtrusive part in the most thrilling events and, if he be successful, has entrée to the most private of inner chambers.

Of the difficulties of the work it were best to say nothing. The reader who is patient enough to read this little book from beginning to end will be able to see them without any pointing out. It should, however, be mentioned that no one without a liberal store of good nature and a patience to which that of Job would appear as a fiery indignation, need attempt to make a business of press photography. Drawbacks to the work, barring its difficulties, there are none, unless it be those entailed by the necessity of being out and away from home at all hours of the day and night and in all kinds of weather, fair and foul.

Dividing the Field

Photography for the press may be roughly divided into three different classes. There is the making of pictures for the daily and the Sunday paper, which is an art in itself. The illustrated magazine, by which is meant the monthly periodical as well as the weekly, and the pictorial reviews, require photographs of an entirely different character. Finally, there are the trade-journals, comparatively obscure in the garish light of their more prominent neighbors, but offering a special field to the man with the camera and possessing a huge audience and a varied interest.

The Press, spelt with a capital "P,"
Newspaperdom is almost universally taken to mean the
daily newspaper and its Sunday relation.

It is to this branch, therefore, that consideration will first be given. The photographic requirements of the editor of the daily paper are absolutely without an end, but his more prominent needs may be treated of, a

paragraph at a time, as follows:--

He invariably wants pictures of accidents. A cablecar collides with a horse and carriage—a woman is thrown to the street—a crowd collects, and the editor wants a picture. He will be a spry press photographer, indeed, who can get word of an accident of this character, pick up his apparatus and arrive in time to get anything but a rear view of the departing crowd. But if he is successful and the persons concerned are of any prominence, his reward will be apt to be out of all proportion to the labor involved. Accidents of a more





A Burning Ferryboat — at night
 The Fire is ander Control

From photographs furnished by C. H. Claudy



An accident of this kind makes good "copy" for the press photographer

From a print by II. Mackenstein, Paris

serious character, such as the collapse of a building, the wreck of a railway train, the burning of a bridge and the like, allow a little more margin of time, but the press photographer will be no less in a hurry to get upon the scene. It will be well to mention here that no matter where the accident may occur, no matter how far away or close to the office of the journal, the following particulars will be insisted upon by the editor:—

Descriptive A full, descriptive title of each and every picture.

The day and hour of the happening, and the time of day when the picture was taken.

The name of the town, name of the street and, if the accident occurs in or about a house, the number of the house.

The number of people involved in the affair, and their names and addresses.

The names and addresses of the killed and wounded and the disposition of the bodies, living and dead.

If the accident is in the country, the distance to the nearest important town, and the direction in which the

view was taken, as, "Looking Northeast."

These particulars apply to any and all events which may be photographed for press use. Of course, in the case of a large city accident where the editor has a half-dozen reporters on the spot, the photographer need not trouble himself for names and addresses. But it will always be appreciated by the editor if the data are given, and will, at least, be a training for the time when the information will be an absolute necessity.

When murder occurs, the spot is usually so closely guarded by the police that anything but a photograph of the immediate vicinity or the house in which the crime was committed is extremely difficult to secure. Of course, it is greatly to be desired that a picture should be obtained of the room in which the crime was committed, of the murderer, or the suspected party, and of the victim, if possible. A liberal supply of tact and ingenuity, the absence of any conscience except that of loyalty to one's paper, and a plentiful supply of small change for the tipping of servants, etc., not infre-

quently, however, secures admission inside the police lines. A friendship with police officers is often of the greatest possible value, and an acquaintance with the police reporter of any local paper of the greatest assistance.

Even more than in the events described in the preceding paragraph is it necessary to accompany your prints with the most minute and exact details regarding the murder. As before mentioned, this is particu-

larly the case if the prints are to go out of town.

The photographic reporting of fires is a simple achievement compared to the work just described. Views of the engines at work (such as those accompanying these pages), of the building in flames, of the crowds, are all interesting to the public, and, while more or less common, find a ready acceptance by the "art" editor. Of course, if any one is lucky enough to secure a snapshot of a thrilling rescue, there is apt to be jubilation on his return to the office. Even an editor, however, will not expect you to manufacture rescues in order to take photographs of them; although, if you will not whisper it too loudly, I will confess that such things have been done.

The locality in which an accident has occurred is frequently photographed, even when there seems to be no immediate use for the print. A lawsuit may be forthcoming, or an unexpected death result, in which case the picture will come in very handily; so that it never comes amiss to make such a picture, even when there

is no immediate demand for it.

One of the most exacting demands of
Public Men editors is that pictures of public men be
secured at all times and in all places. If
you have a connection with some local paper, it need
never surprise you to be ordered, day or night, to secure a photograph of such and such a man in such and
such a locality. It is sometimes inconvenient, if your
victim refuses to go to the place in which you wish to
photograph him. When your subject is thus refractory,
do not go back and tell the editor until you have first
made a photograph of him in some other place. After

one of the numerous occasions in which the late Thomas B. Reed distinguished himself by lashing the House of Representatives to a state of carefully subdued frenzy, only to turn them out of doors like a flock of released school-children, the editor of a prominent New York journal sent a telegram to a press photographer of my acquaintance to get him a photograph of Mr. Reed, either in the House or leaving the Capitol. Of course, he wanted him with the imposing legal background which either of the two localities mentioned would have

afforded. My friend tells the story as follows:

"I stayed not upon the order of my breakfast, which was at that time being consumed, but immediately repaired to the office of a local paper, where I obtained Mr. Reed's program for the day. As it was a very cloudy day, and as I was in anything but good favor with the officials who had charge of the House of Representatives gallery, I knew that it would be impossible to secure a photograph of him in his official home. So I wasted no time in that direction, but posted myself on the Capitol steps, and, with a corps of three messenger boys distributed about the building to warn me of any sudden change in plans, I awaited his coming. shifting from one foot to the other for two hours, I spied one of my small messengers toiling up the steps in a great hurry. He informed me with a gasp that-Tom Reed-he's goin' bicycle ridin'!'

"Waiting only long enough to learn his whereabouts, I ran down the steps just in time to see Mr. Reed's ponderous bulk rolling away in front of me upon his wheel. In desperation I raised my camera and managed to take one snap-shot before he lost himself in a crowd of vehicles. In anything but a pleased frame of mind, I finished up the picture and sent it away. It is unnecessary to say that I was both surprised and delighted to receive a cordial letter of thanks for my efforts, and to learn that the picture entitled 'The Czar Leaving the Battle Field' had been a pronounced success. I read myself a lesson on this little incident, and have always since found it to be a paying matter to get the best picture possible, no matter how widely divergent

it may be from the picture desired."

Of course, the making of pictures of public men is not confined to the practice of securing them on the sly or in getting the subjects to unconsciously pose in strange and photographically difficult surroundings. Frequently, the editor will want a picture of some one. which will be taken with the subject's full and entire consent, in hotel, private house or office. This branch of press photography is one of the quietest and, at the same time, one of the pleasantest, involving, as it does, a quiet hour spent in quiet surroundings with the element of uncertainty entirely obliterated and, usually, courteous and respectful treatment. It may be as well to mention at this point that, in taking the picture of a public man under such circumstances for press reproduction, the effect to aim at is one of broad masses of light and shade. Fine detail, Rembrandt lighting, line lighting, or any of the dozen-and-one fancy effects which the expert loves to secure, are not only unnecessary, but may be positively disadvantageous, for reasons which will be explained more fully when consideration is had of the making of half-tone plates.

Closely allied to the making of pic-The Eternal tures of public men is the securing of Feminine portraits of society women and actresses. The former more frequently desire to be photographed full length, in order to secure a representation of some costly or otherwise remarkable dress. There is little advice to be given the press photographer who is required to do this branch of work, save that ambiguously concealed in the phrase of the art editor of a New York daily, who was once understood to lay down the law that "A press photographer should conceal his identity by appearing a gentleman." The art editor in question doubtless meant nothing unkind in so phrasing his idea of the advisability of the photographer dressing neatly and in good taste and carrying his manners more carefully than his instrument, but it was one of those things best left unsaid. In spite of good breeding, neat appearance and careful work, however, it will often be found a difficult job to please the society belle and one's editor at one and the same time. Unreasonable as the advice may appear, it is founded upon

sound experience to say that it is best to promise to please the lady while the portrait is being taken and yet so manage affairs that the editor is pleased in the end! By that time you are out of her clutches and, if you never have to go and photograph her again, have safely steered your bark between Scylla and Charybdis. Of course, this plan of procedure works fatal results if the lady is one of whom new photographs are demanded.

As was previously mentioned, detail in the dress is usually the main thing to be sought after. The detail, however, in the finished print should appear in bold black and white relief, even to the "soot and whitewash" stage, rather than the artistic shading and the half-tones so desired by the careful and artistic worker.

Games of all kinds are a fertile field for press pictures. Football, baseball, tennis, foot races, boat races, golf matches, sparring matches, wrestling bouts, etc., make splendid and interesting pictures which editors love to handle. They are the easiest of subjects, too; their quick action and constantly changing aspect presenting all possible groupings and attitudes in the smallest space of time. The press photographer who would make a real success of this work, however, should know something of the games which he photographs, in order to catch the players at some exciting moment or critical point of the game.

Last among the more common fields The Underwhich the photographer for a daily paper World will have to encounter are those which take place, as it were, under the eyes of the police. Arrests of all kinds, criminals, rescues, all come under this head, and all demand a large amount of that quickness and dexterity which are the stock in trade of the newspaper camera man. Photographs of criminals can usually be obtained from the professional who makes the rogues'-gallery portraits, but, when exclusive pictures are desired, it is usually not difficult to obtain police permission to photograph the prisoner in his cell. But getting the permission of the police is one thing and obtaining the permission of the criminal is quite another, and there is room for much tact and ingenuity in overcoming their oftentimes violent dislike to being photographed. Best, perhaps, of all the tricks is the time-worn device of making a "fake" exposure and then calling, "All right!" in a cheery and satisfied tone. The unwilling subject, who, an instant before, was all grimaces and grotesque attitudes, will frequently resume, with a sigh of relief, his natural expression, when the real exposure may be made without the subject being aware of the fact.

We have now taken a glance at some

Emergencies of the many varieties of local work which will be required of the man who would photograph for a daily paper. Not infrequently he will be obliged to deal with happenings out of town, either for his local paper or some of the larger journals in bigger cities. As out-of-town assignments usually mean something very important, it is always wise to go prepared for other emergencies than the one you know you are to meet. An entire pictorial story may be lost by leaving the flashlight apparatus at home simply because the work which you expect to do is to be done in daylight. To illustrate this point, I make room for an anecdote told me by an itinerant photographer who

had once been on the staff of a daily paper. He said: "I had been sent a distance of some sixty miles from base one afternoon to get, if possible, pictures of a certain presidential candidate, who was scheduled to make a rear-platform speech in a town called Smithville. I had not taken my flashlight, because I knew the work I was going to do would not need it. The town of Smithville is on a river of considerable size. That evening about six o'clock a lively wharf fire occurred. The other fellow, who had come to the place for the same purpose that I had, got a boat, went out on the river, and with the help of some local talent got a lot of good flashlight pictures of victims in the water, first taking their pictures and then rescuing them from the flames! His pictures were fine, and I had none. He got a considerable sum of money from the magazinerights of his stuff-I lost my place!"

There is no reason why this photographer should not have had the same pictures as his rival but for his mistake in leaving the means to take night photographs at

home. The traveling equipment should, however, be as light as possible and should include as few pounds of material as practicable. For instance, if you are sent twenty miles to photograph the newly-erected monument of some soldier or statesman there is no necessity of taking a dozen plates and half as many holders. It may, however, be found vital to have a folding pocket Kodak in the pocket, as an impromptu demonstration may be going on around the statue which could never be obtained by the use of an 8 x 10 view-camera. The matter of what cameras to use and what materials to employ, and so on, will be more fully dealt with under the head of "Practice."

If reiteration did not make such monotonous reading, about every other paragraph of this monograph would be devoted to an assurance of the necessity of speed in photographic operations conducted for the daily paper. The papers must have photographs of events or places as soon as possible after the orders are given the photographer. No matter what transportation difficulties may be encountered, what weather Jupiter Pluvius may bestow upon you, no matter what exasperations and tribulations your subjects may hand you out, you must secure your negative, make your print and deliver it to the editor in time for him to have a plate made which will be finished before the hour of going to press. This one item of speed is frequently worth more than all the rest of a make-up of a picture put together. Oftentimes your orders will read "Anything so it will print, provided it is here on time."

If not regularly employed as a phoCredentials tographer on a local paper, there is no
necessity to advertise the fact when
attempting to make pictures. If you think you have a
story which will sell, involving some man or locality
which you cannot reach unaided, go to the editor, explain your difficulty, and ask him for credentials. If
he knows you by reputation or is satisfied that you are
what you claim to be, he will give you a letter, or other
documentary evidence, that you are the accredited representative of his journal. Attention to this little hint

may prove the making of the magic key which will unlock the most difficult door. Never, under any circumstances, introduce yourself as the representative of a paper from which you have not secured permission so to do. It may work once or twice, but will be sure to get you into trouble in the end. Nothing makes an editor or a publisher more indignant than to have the name of his paper taken in vain by persons of whom he knows nothing. It is necessary for him to be thus particular, as otherwise his journal would speedily secure a badname, as having representatives who not only knew not their business, but who would oftentimes be, in manner and conduct, a positively hurtful influence to any journal they claimed to represent.

I have said "Never under any circumstances." Of course, there may be times when such an act is justifiable; but, if the paper is ever to find it out, be sure you have something in picture or story to present to it as proof of the justice of your assumption of connection, otherwise your fur will be apt to be smoothed the wrong way, if you are so lucky as to escape its being made

to fly—as the phrase has it.

"How shall I reach the editor?" is Making a question not infrequently propounded Connections to those whose newspaper experience is past the a-b-c's. Theoretically a difficult matter, involving a contest with office-boys and journalistic slaves without number, - actually there is no more accessible person than the city or art editor of a daily paper. If you have a story to tell, do not wait for letters of introduction or a personal ditto, but call on him in person: without the waste of a minute tell him what you have in the fewest possible words, and as clearly as you are able, and do not remain to bother him with persuasions if he says "No." Editors are busy men, and they spend their lives in making quick decisions, which they seldom change once they are rendered.

Reaching a paper out of town is a little more difficult, because the factor of personal appearance and address is lacking. Do not, whatever you do, write to an editor and say—"I think I could make some photographs which would prove interesting to your readers. Would



A CITY FIRE C. H. Claudy



Construction Work: New York Subway

Showing a tunnel with traveling wooden arched center for placing concrete arch

From a photograph furnished by C. II. Claudy

you like to see them?" or some other such tentative and polite form of address. Write to him when you have something to show him, and send what you have to show with your letter. If you have not the material to show and want an order to get it, say so in the first line of your letter in the most "contrasty" way you know how. Remember that he has a million and one things to think of and that your letter is but a minute incident in his day's work. If it is to gain more than passing attention or stand out with "sharpness and detail," it must be forced upon his attention, not politely referred to him. But the better way, in all cases, is to let your work speak for you. If it is good, and you are able to do what he wishes and in the way he wishes it, you may be pretty sure, if he has not already a photographic connection with your town, that the next time somebody gets murdered, or a cyclone comes your way, or the President makes a speech to the employees of the big

mill, you will get the work of picturing it.

A Few
"Don'ts"

no apology, except for triteness, need be offered for the

following:

Don't bring an editor photographs of events a week old.

Don't bring him blue prints, unless he asks for them.

Don't bring him pictures that he can get anywhere.

Don't bring him pictures which will be an advertisement for any local merchant, if it can possibly be avoided.

Don't bring him half-a-dozen pictures and let him choose the one he likes the best, when he has given you a definite order. Make what he tells you to make and he sure he will be satisfied.

 $\mathcal{D}_{\theta n}$ 't bring him one picture when he has ordered another because you "thought it would be better." Bring him a substitute rather than no picture at all, but remember that orders are given to be carried out—not to be tampered with.

Syndicate
Work
Work

Work

Before we leave the subject of the requirements of the daily editor, it will be necessary to say a few words on the syndicating of pictures. Syndicating is sending the

same picture to more than one journal. It is not proper in this work to sell to any two local papers the same photograph for the same issue of the respective journals. If paper number two is willing to publish the photograph the day after paper number one has it. you may be very sure paper number one will not object to your selling a copy of the photograph to number two. You should not, however, sell to number two a photograph which it believes to be unpublished, if you value your connection therewith and hope for future orders. In syndicating pictures out of town, it is not necessary to be so strict. The same photograph, for instance. could generally appear in a Boston and a New York paper of the same day without either conflicting with the other. And if you are so fortunate as to possess the favor of a dozen editors in as many different cities, there is no journalistic objection to your sending to them all the same photograph, providing the cities are a sufficient distance apart. As previously mentioned, however, do not risk your connection by failing to tell that the picture sent is syndicated. No journal wants to publish a photograph with "Exclusively published by the Gazette, " only to find the same photograph in a dozen exchanges, the next day. Such an occurrence would heat hot water for somebody, and the unwelcome bath would probably be taken by the photographer.

The preceding outline of the work of a photographer for a daily paper is not to be considered in any wise exhaustive. Many other varieties and kinds of work will be required—some difficult, some easy—which could not possibly be mentioned, let alone described, in an article of this length. The performance of any and all kinds of work, however, should be made in strict compliance with two rules, which are "No failures allowed," and "Never, under any circumstances, be

late with your results."

Magazine
Work

Work

Work

daily paper, although there are certain points where photographic work may interest both classes of publications.

One of the happiest fields of work is the supplying of photographs which are accepted and printed for their artistic beauty alone. Many publications of this character will print a photographic cover, if it is unique and striking or can be utilized as a title-page design. Examples of this work are too common to need particular mention, but, in order to be exact, "Country Life in America" may be mentioned as a shining example of the uses of some of such photographic efforts. as yet little worked is that of illustrating fiction. man who can write a good story and send a first-class set of photographic illustrations together with it will stand a hundred chances of success, where his brother scribe who has no photographs will stand one. On the other hand, the photographs to illustrate fiction should look their part and should not be bald portraits of the first him or her at hand, posed in a conventional attitude. I would not care to go into the psychological factors which ordain that a photograph to illustrate a story, which is attractively vignetted, has much more fictional atmosphere than that which is sharp to the edges, but the fact, nevertheless, remains. There is a field, too, in this department of press work for the man who can develop his bromides or platinums with a brush.

By far the biggest field, however, for National the photographer, when catering to the Events wants of a monthly magazine, will be found in portraying events of national interest. Inaugurations, for instance, bring to Washington regiments of photographers, not only those employed by the bigger journals,—such as "Collier's," "Munsey's," etc., -but those who come on their own account and who syndicate their pictures first to the daily paper and then to one or more magazines. Dedications of important statues, laying the corner-stones of buildings, etc., are also fertile material for the photographer. The launching of battleships, funerals of public characters, fires sufficiently large to attract more than local interest, as for instance the great water-front fire in New York a year or so ago, unusually large railroad disasters, hurricanes, floods, and all the wilderness of accidents which happen, are money-makers for the press camera man.

While acting as a free-lance in such matters can often be made to pay, it is yet wiser, if possible, to get a contract from a magazine for the work you undertake to Such contracts are, of course, provisional that your work when done will be satisfactory; but it is much pleasanter to go to work with an order from the editor in your pocket than with a displeasing uncertainty as to whether or not your pains and time may not be all in vain. Approaching a magazine editor is very much like approaching any other species of that curious genus. In spite of the fact that the monthly editor has thirty times longer in which to do his work than has his brother of the daily paper, he is, for some reason which none of them have ever been able to satisfactorily explain, in about twice as much of a hurry. Therefore, brevity and directness in approaching the magazine man are of even more value than in getting at his daily-paper brother.

All that has been said of the editor of the monthly applies to the editor of the Weeklies weekly. The scope of the weekly, how-

ever, is, photographically speaking, much wider than that of the monthly publication. Matters of metropolitan interest not sufficiently great to interest the readers of the magazine of national and sometimes international circulation, are frequently affairs of moment to the clientele of the weekly journal. Particularly is this the case of the weeklies published in New York city, which are, in effect, pictorial reviews, not only of the world in general, but of the happenings of the city in which they are every seven days born anew.

It will not be again necessary to run over the entire list of possible photographic subjects, but a few among them may be mentioned. New buildings, accidents, of course, celebrities, political, dramatic and foreign, and freak pictures, all demand consideration here. Freak pictures include not only strange photographic effects, which are distinctly salable, but representations of happenings not usually photographed, such as a falling 150foot brick chimney (see accompanying illustration), a locomotive derailed in a corn-field, a balloon collapsing in mid-air, etc. Ordinary portraits taken in front



Photographing a Burning Factory at Night From a photograph furnished by C. H. Claudy



The Stevens Airship - Flight of September 30, 1902 From a photograph furnished by C. H. Claudy

of a background and showing nothing more than head and shoulders, are frequently demanded by the editor of an illustrated weekly for full-page presentation, initial-letter pictures, etc. Portraits of arriving foreigners of distinction are desired as ardently by the editor as the subjects ofttimes object to having them taken. It is a favorite trick of such people to make their arrivals at night, thinking thereby to avoid the snap-shot and its ubiquitous, and sometimes untoward, results. Of course, the introduction of flash-light powder of unusual actinic powers has made this precaution, in a large measure, ineffective. But, luckily, your celebrity is not usually a photographic devotee, and so is not aware of his mistake until too late. So little do some people know of the flash-light that it is sometimes mistaken for the bomb of an assassin. When Prince Henry visited America, he was "flash-lighted" to the great alarm of his guardians. Policemen arrested the unlucky photographer on the charge of attempted assassination, and were with difficulty persuaded to accept the photographer's apparatus as evidence of the innocence of his intentions

It may seem superfluous to here write down the precaution—"Be sure when you take your flash-light that you take the man you are after," but the following amusing incident, which occurred to an acquaintance of mine as the chief character, may serve to point the necessity therefor:

A certain royal personage was to arrive in Washington on the midnight train. As the station was to be closely guarded against photographic and other pressmen, my friend, on receiving his commission to secure a street portrait of the celebrity, awaited his victim's coming near the door of his hotel. Never having seen His Royal Highness, my friend believed that if he took a photograph of the occupants of the first carriage he would be following his orders and could manage to enlarge the necessary head from the resulting negative. Photograph the three occupants of the first carriage he did, therefore, and remained contented until his bromide proof was presented to the editor, who somewhat grimly informed him that His Royal Highness' face was

not to be found thereon. It afterward transpired that the carriages had become mixed and that three servants in charge of the baggage had, all unknowingly, sustained the honor of having their pictures taken for publication. Luckily for my friend, it happened that none of his competitors were more successful, so he still retains his position; but he confessed to me that the chaffing he had to stand for his mistake was almost as bad as being "fired."

Before leaving the special illustrated Exclusive magazine, it should be mentioned that Rights here, more than in any other part of photographic journalism, is exclusiveness of value. some large weekly journal pays you a good price for a photograph or set of photographs, it is with the understanding that you do not sell any more of them until they have been published, and not then unless it was so understood in the beginning. A photograph of any importance, which no one else has obtained, is usually worth more to the illustrated weekly than to any other form of publication, unless it be a few of the biggest of the big daily newspapers. This value is largely made up of the publisher's ability to boast of its being original and exclusive, and no tampering with this quality will be tolerated by the purchaser.

The trade-journal offers a very satis-Tradefactory field for quiet work. Most of Journals the pictures published in these organs are sent in by contributors with manuscript, but special orders to cover particular subjects are not uncommon. To get a commission to make such photographs for a trade-journal it is necessary to satisfy the editor that you possess at least a superficial knowledge of the subject or subjects to which his journal is devoted. shoe-journal, for instance, will not care to have pictures of shoes, shoe factories, show-windows, etc., unless these pictures are taken with an understanding of where the interests of the readers of the magazine lie. journal devoted to horticulture will not care for pictures of vegetable life which do not show either some special point or some item of more than common interest. few sample photographs, carefully marked with name,

locality, etc., accompanied with a letter fully explanatory of your ability and the field which you can cover, will usually secure prompt and careful consideration. Your name will be filed and probably orders sent you if the journal is not already supplied with a photographer in your locality.

Among the trade-journals, the best field is afforded by the scientific papers. Papers Their field is much wider than that of the publications devoted to one particular trade or occupation, and the subjects usually lend themselves more easily to variety and interest. Pictures of collections of all sorts, museums, inventions and machinery will. when accompanied by short-and-to-the-point manuscript, usually find a ready market here, although the prices paid are low compared to those obtained from the bigger As previously mentioned, prices will be treated of in detail at the end of this volume. A copy of No. 48 of THE PHOTO-MINIATURE: Commercial Photography, will be of the utmost assistance to him who would photograph objects of this character. talented author of this monograph has gone very thoroughly into the making of commercial pictures, and it would be presumptuous and unnecessary to supplement his teachings with any further instructions regarding such work and its ramifications.

While not strictly belonging to press Advertisement photography, the making of photographs Work for the illustration of advertisements may be mentioned at this point. The biggest field will be found among the advertisers in towns of moderate size, whose business is mostly local and whose advertisements appear in few, if any, journals outside their immediate locality. Photographs of the place of business of the advertiser, of his staff, and of himself, are frequently useful to him for publication purposes. the photographer is at all gifted with originality, he may frequently add to his income by getting up an attractive advertisement for some merchant "on suspicion," illustrating it with a catchy photograph. The field does not apply to the general advertiser, because he has usually placed his business with an advertising agency or else employs his own staff of photographers, artists and advertisement writers.

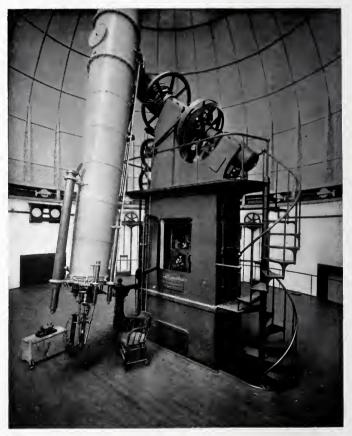
It would be easy to devote as many pages to the field of work of the press photographer and the requirements of editors as I have paragraphs at my disposal. As was once before mentioned, the survey of the business here made is anything but exhaustive and represents only in part the inside of the business. Space considerations, however, forbid further enlargement of the subject, and attention must now be turned to the photographic practice of the art. This will be found different in many respects from that taught in the textbooks, because the ends sought are so often different from those tried for and, alas! frequently sighed for, by him who photographs only for pleasure and the preservation of artistic conceptions.

The Equipment In getting an outfit for press photography, the first thing, of course, to consider is the number and kind of cameras. I have heard the editors of various publications (among them my oft-quoted friend the Art Editor) say that the press photographer should have one camera capable of doing all kinds of work, but, as I have never seen such a camera and do not believe that such an instrument could possibly be made, I shall consider a few of the various forms of cameras on the market in the light of their adaptability to this branch of photographic work.

Some form of hand-camera is, of course, an absolute necessity. Preferably it will be of the reflex or Graflex type, which allows the view to be seen right-side-up on the ground-glass up to the instant of the exposure. The old twin-lens variety of camera is, save for its greater weight and bulk, equally as serviceable. As previously stated, such a camera is indispensable in taking any moving objects for press use, whether it be a naval parade or a dog fight. If such a camera cannot be included in the outfit, any good make of handcamera can be substituted and provided with an extralarge and extra-brilliant finder. It is preferable that such an instrument have no greater length of bellows than is necessary for the focus of the lens used. This,



Destruction of a Chimney
Here the press photographer had only an instant's chance
From a photograph furnished by C. H. Claudy



The 26-inch Equatorial Telescope, Old Naval Observatory, Washington, D. C. Showing the extreme wide-angle work sometimes necessary in press photography

From a photograph furnished by C. H. Claudy

in order to reduce weight. Similarly, it should be of as slight a construction as possible and certainly not over 4 x 5 inches in capacity. It should, if possible, have the rising front worked by means of a rack and pinion, and should certainly focus by that device. Whether it should be fitted for films or plates is a matter for each individual photographer to decide for himself. In spite of their greater weight and cumbersomeness, however, I have always found plates to be preferable, as being so much easier to handle after exposure. While not so great an item in ordinary photography, when great speed is not essential, in subsequent operations ease of handling material is quite an item.

A small film-camera, say 3½ x 3½ inches, and preferably of the fixed-focus variety, will be found a most handy addition to the outfit. It should by all means fold up so as to go conveniently into the pocket, and should have finders of both horizontal and vertical views. On both such cameras it is strongly to be advised that all bright metal work be blacked over, in order to minimize the attraction of public attention.

A good view-camera, 8 x 10 inches or larger, will be found of the utmost service in taking photographs for magazine use. It should be provided with a very long bellows in order to allow for copying and telephoto work, and one should never be purchased which does not have a back-focus. I have known many men who photographed regularly for press purposes who had only one camera and who made it serve, as per the instruction of the Art Editor above quoted, for every purpose; but they were, of course, handicapped in their work. It is much better to have two or three instruments for the various classes of work which may present themselves. It would be idle to spend more time and space than is necessary to barely outline the kinds of hand-cameras required. No. 3 of THE PHOTO-MINIATURE series will be found a most helpful volume to read about these instruments and the way they should be used, treating, as it does, of all varieties of handcameras and their advantages and disadvantages. It will be well, also, to read No. 4: Photography Outdoors

at the same time, and No. 14: Street Photography contains many helpful hints for the press photographer.

The lens, as in all photography, is a most important part of the outfit. While Lenses the ordinary rapid rectilinear lens will do on occasion, it is forever failing one at the critical moment. Therefore, I would advise no less than one of the very fast anastigmats for press photography. This fast lens should possess a focus equal to the diagonal of the plate used, in order to include a medium angle of view, say from sixty to seventy degrees. not necessary to purchase a convertible anastigmat, as, when it is required to substitute a long- for a short-focus lens, there is seldom time to unscrew and put back an element. It is, of course, essential to have a long-focus lens, certainly not less than fifteen inches for a 5 x 7 plate, but it is not necessary that it should work at a greater speed than f/8. Photographically shocking as it may appear, I must confess to the use of an old-fashioned Darlot single lens corrected for nothing but chromatic aberration. Of course, it is not rectilinear, but it serves very well for anything but the photographing of tall buildings or objects in rapid motion. As a fifteeninch rapid rectilinear lens, working at f/8, can be obtained for about fifteen dollars, it is poor economy to do without one. A wide-angle lens is an absolute essential. It is much better to spend one's extra money on a wide-angle anastigmat than an anastigmat longfocus, because it will be more often used and distortion increases rapidly with a decrease in focal length. All the better-known anastigmats are good, but one should not be selected which has too much machinery to be used in its operation. Further particulars in regard to lenses will be found in THE PHOTO-MINIATURE series, No. 1: Modern Lenses, and in No. 36: Lens Facts and Helps, a wealth of detail is presented which should enable any one with a clear conception of what he wants to pick out the best lens for his purpose.

Almost as important as the lenses are the shutters to be used with them. I say "shutters" because it is advisable to have two, one a focal plane shutter and the other a

between-lens affair, or a speedy drop shutter working in front or behind the lens. Those shutters which are dust-proof and which have been on the market a sufficient length of time to have been thoroughly tested, will of course recommend themselves to the purchaser over those as yet untried. Personally, I prefer the Thornton-Pickard focal plane shutter and the Goerz Sector to any others, although the Bausch and Lomb Volute promises to be a popular and satisfactory instrument. Have your between-the-lens shutter mounted with your medium-angle lens, and for the long-focus lens use a cap or the focal plane shutter. Of course, if money is no object to the photographer (and I never met one to whom it was not) it would be desirable to have the best of shutters fitted to all the lenses, but this is not at all necessary.

In regard to the proper plates to be used, little need be said except that Plates usually a very fast plate should be employed and that only one kind of plate should generally be used. The press photographer wants to feel sure when he picks up his bag, just what variety of plate he has with which to work. There should be no disquieting uncertainty as to whether holder number three contains one slow and one medium plate and whether holder number two has one Seed 26 x and one Cramer Iso or some other unknown combination. And, speaking of isochromatic plates, it will never be found necessary to employ them except in photography for the artistic magazine or in covering some specially colorful assignment. Usually they simply add expense and care in handling, are seldom of any decided value to the press photographer and are oftentimes a definite inconvenience in practical work.

The plate-holders should not econoPlate-holders mize weight, as do the cameras. It is
better to save ounces on the camera and
put pounds on the plate-holder than have an outfit
which is light throughout — perhaps admitting light
to the plates. For all ordinary assignments, six plateholders is four too many. But as there will most certainly come a time when you will want more plates
than you can comfortably carry, it is a wise expenditure

to lay in at least a dozen holders. These are only provided in such quantities for the camera most commonly used. Twelve plate-holders for a 11 x 14 view-camera would be about as pleasant to travel with as a young

elephant, and quite as unnecessary.

I think I could write a book alone about the proper kind of tripod to be Tripods employed. If I was not afraid of shocking the photographic conservatism of the editor and my gentle readers, I would be inclined to advise the intending outfitter to buy his tripod first and get the camera and lenses out of what was left of the appropriation. If there is anything more exasperating than a day spent in difficult photographic work which ends up in plates so blurred and fuzzed by a "climax," handhighly - burnished, triple - expansion, screwed, fold-up-for-the-pocket tripod, I do not know what it is. By all means, never use a tripod if you can help it. But when you do use one, use one which deserves its name, and which would be insulted by the appellation "tri-straw." Get a tripod of oak or ash or hickory, or cast-iron, if necessary,—the former preferred,—and let it have a top big enough and strong enough to sit on, rather than one of the dainty "boudoir" tripods usually sold to beginners.

Focusing Cloths cannot easily be too big, and not only can be, but usually are, too small. It ought to be big enough to be doubled and still cover enough area to protect the camera and lens from an unexpected shower; but let nothing in this statement be construed into the advice to get a rubber cloth, as they invariably crack and split in a short time. Besides felt, which is rather heavy, there is nothing better than good Italian cloth, which comes a vard wide at a reasonable price.

The carrying case for the larger camera should, if possible, hide the fact that the owner is a photographer. It is frequently necessary to get one's photographs surreptitiously, and, the more you can disguise yourself as a gentleman or commercial traveler, and the less you look like a photographic supply-house on the move, the

better your chances of success.

Space forbids consideration of the Flash-light various kinds of flash-lights upon the Apparatus market and their relative advantages and These are so fully treated, however, in drawbacks. THE PHOTO-MINIATURE NO. 29: Flashlight Photography, that I will not take time to say more than that a good flash-light, or perhaps an outfit of two of them, capable of lighting up a large area out of doors, is often as much a necessity as the camera.

Í have been asked whether I employ an assistant in press work. Assistants there is little, if any, necessity for such a helper; but occasionally, and particularly in flash-light work or in cases where extra speed is desirable. his presence or absence may determine your success or failure. I can recall one case where a lawsuit was very bitterly waged in a comparatively small town about a certain office-building recently erected there. The case was going against the plaintiff and one of the local papers was warmly espousing his cause. I suggested to the editor, at about the last available moment (my bright ideas have a happy faculty of arriving about that time, if not altogether too late), that it would be a good feature to get pictures of some of the cracks in the floor upon which the contest turned, and publish them in the next morning's issue, which would be upon the last day of the trial. The paper went to press at 3:45. It was 2 o'clock when I made the suggestion. The emergency reporter was detailed to help me and, with view-camera and flash-light, we proceeded to the building. A little loose change, accompanied by our cards, successfully hypnotized the watchman into admitting us and providing us with a step-ladder. successfully photograph cracks in a stone floor with an ordinary apparatus, it is almost necessary to stand upon one's head. As it was, I laid the tripod across the top of the step-ladder, focused while hanging onto a near-by railing with one hand, and then sat upon the tripod and opened the shutter while my assistant set off three flashes in rapid succession, the last two being accidental and due to his unfamiliarity with the apparatus. We rushed back to the office, where I developed

the plate in a closet with an improvised dark-room lamp made out of a candle and a ripped-open red neck-tie pasted across a hole in a cardboard box. Luckily, I happened to have some developer and hypo in the office, but trays were conspicuous by their absence. I developed the plate by pouring the developer on it and tilting it to and fro and fixing it in a succession of pasteboard boxes, of which there luckily happened to be a good supply on hand. In the meantime, I had sent a messenger to my home, not more than a half mile away. After waking up half the neighborhood, he returned with a package of bromide paper with which a sufficiently good proof was secured from the still wet negative to take to the engraver, who made a plate just in time to reach the last form. It would be pleasant to chronicle that such Herculean efforts were successful in defeating the ends of justice, but the trial apparently progressed in very much the same way as it would have done had we published no such feature. The anecdote illustrates not only the necessity for an assistant and the use of a flash-light, but the tornado-like way in which the press photographer must sometimes work.

The ever-present question of exposure is as important in press photography as in every other kind. It is however

in every other kind. It is, however, strange though it may seem at first glance, better to slightly underexpose one's negatives than to give them too much time,—at least when working for the daily paper. The reason for this is found in the fact that the reproductive processes used in newspaper work are as yet so far from perfection that what is wanted is a bold effect of masses of light and shade,—excessive contrast, in other words,—rather than soft gradation of half-tones and minute detail. The following quotation from an article on Journalistic Photography, by Robert E. M. Bain, so accurately covers this point that no apologies are necessary for its presentation here.

"A moment's thought will discover that it must, of course, be impossible to get the same effects on paper from a press going at the rate of speed required to produce our daily journals which would result from a book press going at less than one-tenth the rapidity.

The kind of ink used, the character of paper and method of 'make-up' also constitute disturbing elements com-

pared with book illustrative work.

"Surfaced paper used in illustration gives to a fine half-tone photograph a finish almost equal to the best albumen paper when burnished, and the slow speed of the press allows of so fine a screen being used as to

show distinctly the most delicate details.

"In newspaper work the screen must necessarily be coarse, so that the electrotype will not fill up when inked by the immense and rapidly worked rollers. In this way the finer details are lost before the plate goes to press. The ink being free-flowing and thick, to give a rapid impression, gets into the finer lines of the block, despite the utmost care, and hence many pictures appear more or less smudgy or black. The kind of picture most desired for news-press work is not necessarily sharply focused, but has bold effects, strong lights and shadows and strong action. Newspapers do not pretend to print fine drawings or etchings save as special work separate from the news sheet. The result would not harmonize with the artists' reputation and skill. artists doing sketch-work for the daily newspaper use broad, bold lines in their work and deal in general effects, omitting, save when absolutely necessary, any of the finer details. Pictures of animals showing great contrast, especially between the object and the background, or pictures of public men of strong features, soldiers in the field, buildings showing great angles or prominent decorations,-all these are the kind of pictures which make good reproductions in daily papers; and with the foregoing explanation it will at once be understood why. A cozy nook along a river with much detail in the shadows, or a group of people spread over a large flat surface are not good subjects, while the bold promontory with prominent trees and rocks in the foreground will prove a success at once and pronounced."

The development, except in special Development cases, to be treated of directly, should follow out the plan of obtaining contrast, and should, therefore, not be too diluted or weak in reducing agent. Usually, pyro will be found the

most satisfactory developer. It will be unnecessary, as well as impossible, to make room for formulæ here, as THE PHOTO-MINIATURE, Numbers 11, Developer and Development, and 34, More About Development with Pyro, Metal and Ortal, cover the ground in such a thorough and satisfactory manner. The following formula, however, is one which I have found to give satisfactory results with almost any brand of plates and which is a good safe developer to use: Solution No. 1. Water, 15 ounces; sulphite soda crystals, 2.5 ounces; carbonate soda crystals, 1.25 ounces. Solution No. 2. Water, 12 ounces; oxalic acid, 7 grains; pyro, 350 grains. use, take one ounce of number 1, one-half ounce of number 2 and from two (2) to four (4) ounces of water, according to effect desired and temperature. Use more water in hot weather and less in cold.

It occasionally happens, as in the incident last given, that the photographer must work against time, so that minutes are, in more senses than one, a matter of "moment." When such is the case, it is better to fully or over-expose and to use a developer such as metol-hydroquinone, metol-pyro or edinol-ortol. The metol and the edinol start the plate in a hurry and the hydroquinone, pyro or ortol give density in the minimum of time. For such work, the fixing-bath should be strong, should have lots of acid, alum or some other hardener and should be warmed. It is possible to put a negative in the developer, fix it and get a print from it in less than fifteen minutes if the worker is familiar with his tools and his conveniences are handily arranged.

Reproduction Methods

The reproductive processes used in newspaper work are two in number. One is the half-tone on copper and the other the line-cut or zinc-etching. The half-tone is a positive print on copper, made with a negative which has been cut up into tiny circles or squares by means of a "screen." The surface of the copper is treated with enamel which adheres to the points of metal formed by these squares and leaves the copper between the dots free to the action of an etching-bath. The line-cut is a print from a negative (having no half-tones) upon zinc, which is etched in a similar manner.



Depattment in a Modern Watch Factory. Example of Work for a Technical Journal From a photograph furnished by C. H. Claudy



Climbing the Capitol steps in an Automobile Copyrighted 1903, by the Cadillac Automobile Compary

There are, of course, any number of Prints for varieties of these two processes, but Reproduction their use is more or less restricted and the instructions about to be given regarding the variety of prints needed in each process will apply to any of them. The half-tone process almost invariably loses much of the purity of the original. For this reason. prints for half-tone work should be made upon some of the print-out papers which give great detail in the shadows and half-tones. Kloro or Solio are examples of this kind of paper. Glossy Velox and Portrait-Velox are almost as desirable and may be printed by any artificial light. A mistake frequently made by writers on photo-mechanical subjects is that of advising the necessity for a glossy paper for half-tone work instead of a paper giving detail. I have seen instructions for making gum-bichromates glossy in order to prepare them for the photo-engraver! The mistake is in considering the glossiness the desired feature instead of the detail and the half-tone gradations, although the glossiness is desirable as destroying the "grain" of

Many publications, both daily and monthly, maintain art-rooms, where photographs are prepared in fancy frames and doctored with washes until all semblance of their original character is lost. Prints for this variety of work should be on a plain paper, having no surface emulsion, such as the rough bromides, and should be fully exposed and very much under-devel-

oped, giving a full but faint outline.

The blue print, or black print, which is simply a variation of the ordinary ferricyanide paper, is what is used frequently in preparing a photograph for a line-cut reproduction. The outline of the photograph is gone over with waterproof ink by the illustrator and the half-tones and shadows afterwards bleached out, leaving a line drawing upon plain white paper, which becomes "copy" for the engraver. Blue prints should never be submitted unless requested, as it is practically impossible to make a reproduction from them in half-tone.

Prints untrimmed and unmounted are, in nine cases out

of ten, more acceptable to the editor, whether he be the captain of a daily, a weekly, a monthly or a trade journal. It allows him to use his own individual taste and ideas in trimming, and because of the peculiar manner of makeup of some of the illustrated pages of daily journals, he may often desire surroundings and details in your print which you consider entirely outside the question and altogether inartistic. There are cases, however, when it is better to mount the print. Very large photographs which must be sent some distance are oftentimes protected against injury if mounted upon cloth. But, if so treated, it should be with some mountant which fulfils its manifest destiny and sticks, and does not, like many, if not most, of the so-called photographic pastes, cockle and come away from its support as soon as dry. A slight admixture of fish-glue with any good paste makes a capable article for such use. Very small pictures can often be advantageously mounted on thin Do not, however, leave more than an inch margin of mount, no matter what style you may employ. The poorest kind of a mount for our purpose is the paper, cover paper or vellum article so much in vogue in the hands of the artistic photographer.

Prints should in all cases bear their Titles and titles upon their backs and any informa-Descriptions tion regarding localities, time of taking, etc., which may be at hand. It is not necessary to give particulars as to the stop used, exposure, plate, etc., as the editor is not interested in your methods of work unless he be the presiding genius of a photographic journal. Always and invariably put your name and address on the back of each and every print or photograph, mounted or unmounted. Have a stamp made for the purpose and use it liberally. Stamp it three times plainly rather than once carelessly. If your print is copyrighted, be sure and so state upon the back of it (see particulars on copyrighting further on). In mailing prints, do so flat whenever possible, and if unmounted prints are so sent, use good heavy cardboard backing so that they will not be bent and broken. Never roll a print if it is possible to avoid it, or unless it be mounted upon cloth. Editors and engravers who are in a hurry have little time, and less inclination, to overcome obstacles which may be easily avoided by

the photographer.

It will sometimes be found necessary Copies for the press photographer to copy the poorly done work of some other man. When this happens, it is always advisable, when possible, to do or have done the necessary retouching upon the "copy" before it is rephotographed, rather than upon the resulting negative. It is advisable because the photograph of a retouched print, which photograph must be again copied by the camera, will soften down the retouching oftentimes enough to make it completely indistinguishable. Do not, however. under any circumstances, retouch your negative, print or copy (and this applies to almost all your pictures) if you can possibly avoid it. The editor and his artists like to have full sway in this department and the operation of retouching usually takes up more time than can be spared. Of course, none of these restrictions are supposed to apply to portrait work or photographing for the finer reproductions.

It will, of course, very occasionally Protection happen that the dishonest editor will return your contribution after having used it. This, however, is so very rare that it may be safely said that at least 75 per cent of the money spent in copyrighting is utterly wasted. Of course, if you have any pictures which are likely to prove valuable in the extreme, it is a wise precaution to have them protected, but the ordinary photograph does not offer sufficient temptation to the dishonest editor or does not find its way into his presence sufficiently often

to make the copyright worth while.

As a knowledge of copyrighting is Copyrighting badly needed when it is needed, it may not be amiss to here insert a copy of part of the printed circular sent by the Register of Copyrights, Library of Congress, Washington, D. C., when requested:

I have the honor, by request of the Librarian of Congress, to explain that, in order to obtain copyright protection for a photograph, three steps are necessary. The first step to be taken is to transmit to this office a printed copy of the title of the photograph (i.e., the name or designation which distinguishes it). A written title cannot be accepted, and a typewritten title can be recorded only at the risk of the sender.

The application for entry of title must contain a distinct statement in whose name the claim of copyright is to be entered. The full name and address should be given of the person who claims to be the proprietor of the copyright. No entry can be made in a fictitious name, such as a nom de plume or pseudonym. name of the claimant should be stated. Not only does the law require that the real name of the copyright claimant shall be printed in the notice of copyright, which it is obligatory to print upon each copy of any article copyrighted, but it also requires that the name of the copyright claimant shall be printed in the "Catalogue of Title Entries." If an author desires to preserve his anonymity and to avoid putting his name on record, he should arrange to have some other person make the copyright entry in such person's name as "Proprietor," under arrangement with himself as author. Entry can be made of a firm, of a corporation, or trustee, or in two or more names as joint authors or proprietors.

The blank should be filled up to state whether the copyright is claimed as author or as proprietor of the

photograph whose title is to be recorded.

When application is made for a photograph, it is necessary to state that the photographic prints are from negatives made within the limits of the United States,

or from transfers made therefrom.

The application for registration should be accompanied by the statutory fee. Only one title can be recorded for one fee and the prints from each separate negative, as well as each photographic pose, require separate entry under some distinguishing title, number or mark at a separate fee.

The copyright fees prescribed by law are as follows:

For recording each title of a photograph, the production of a citizen or a resident of the United States, the charge is fifty (50) cents. If a certificate of copyright (i.e., a certificate of the entry of title) is desired, there is an additional charge of fifty (50) cents, or \$1 in all.

For recording each title of a photograph, the production of a person not a citizen or resident of the United States, the charge is \$1. This fee of \$1 is required to be paid for recording the title of every work whose original author or producer is "a person not a citizen or resident of the United States," whether the proprietor of the copyright is or is not a citizen or resident of the United States. A certificate of such record requires the payment of fifty (50) cents additional, or \$1.50 in all.

All remittances should be by postal money order, or express order, payable to the Register of Copyrights. No money (currency or coin) should be placed in any package of photographs sent to the Copyright Office, and all remitters are respectfully urged to send an identifiable remittance. Postage stamps should not be

sent as fees, as they cannot be accepted.

The second step is to send to the Library of Congress, Copyright Office, Washington, D. C., TWO copies of the best edition or print of the photograph, suitably mounted, before any copies are distributed or published. Each photograph should be plainly marked with its title, differentiating number or mark, and the name and address of the sender and claimant of copyright.

The above two steps taken before any publication of the photograph, are prerequisites to obtaining any

copyright protection.

The third step requisite to obtain any valid copyright is the printing of the claim of copyright on each copy of the photograph. No copyright can be protected against infringement unless the notice prescribed by law is inserted on every copy produced. The wording of the notice is determined by the copyright statute and must be one or other of these two forms: a. "Entered according to Act of Congress in the year..., by , in the Office of

the Librarian of Congress, at Washington; " or b. "Copyright, ,; . . . , by

The name of claimant printed in the notice of copyright, as well as the year date, should correspond exactly with the name as recorded and the year date of entry.

Respectfully,

(Signed) THORVALD SOLBERG,
Register of Copyrights."

Particular attention is called to the Warnings last or third step treated of in the above circular. The best way is to have a stamp made with the legal phrasing required, and stamp it upon the back of the photograph. It is customary for press photographers, in sending prints away from town, to have a stamp made bearing wording similar to the following:—

WARNING.—This photograph is copyrighted by of and must not be reproduced in any way without written permission.

Accompanying photographs bearing the above legend, a license should be sent, worded, something like this,—

In the instructions given upon the application for copyright will be found the following,—"The law distinctly specifies a printed title. If a typewritten title is sent it is at the claimant's risk." This is one of the pleasant little bugaboos for which the government redtape factory is famous. I have not the statistics at hand, but I would be willing to wager that the percentage of loss from typewritten titles in the application blank is so small as to require a high-power microscope

to see it. I do not believe that, if a man had to take his application blank to a printing office, and have his titles printed in, Uncle Sam would do much copyright business on photographs.

Finally, let it be said that in case your copyright is infringed, it is much the

wiser course to compromise or let the matter drop rather than to sue. Of course if your prints represent a value of a hundred dollars or more, the matter takes on another color, but for smaller amounts your suit will cost you more in the end than you are likely to get. If it be asked, "Why, then, copyright?" I would refer the reader to the days of his childhood and the influence of the bogey man upon his good conduct. I never knew a bogey man to appear, either in flesh or spirit, but his influence is potent. In the same way, the magic words "Copyrighted" serve to warn away those who would filch from you your own. It is a preventive measure rather than a cure, and, as previously stated, is often uselessly employed.

We now come to a consideration of the monetary profit to be derived by the press photographer for his work. It is with fear and trembling that I approach this branch of my subject, because unless I had at my disposal two successive years of this magazine and could give an individual list of every photograph-buying periodical and the price paid by each, I could not hope to even approach accuracy or leave the vague realm of generalities.

Every newspaper, every magazine, every illustrated weekly, and every trade-journal, has ideas of its own in regard to the payment for photographs. Some of them have a regular scale of prices, others fix their payment according to the whim of the editor, and still others pay for photographs at ordinary space rates. Excluding exceptional photographs, the average price paid by a daily newspaper for pictures may be not incorrectly stated as from one to five dollars. Now that I have set down this sentence I am afraid that the editor will go over it with a blue pencil and erase it altogether, because to say that an average price is from one to five dollars is to be at once contradictory and

paradoxical. Nevertheless, this is about as accurate a statement as can be made. A newspaper of small circulation in a town of medium size will be apt to pay for photographs at space rates, or at about one dollar each. The big dailies of New York, Chicago and other large cities will pay proportionately more. The monthly magazine will pay somewhat similar rates for ordinary photographs, but much higher prices for photographs of

unusual interest or of important events.

I have before me a letter written by a very prominent newspaper man on the staff of one of the most conservative journals of the country. In this letter he informs me that at the time of the eruption of Mt. Pelee, a certain New York man had the only photographs available of the locality and happenings there. My correspondent says: "I understand he got a very large price from some of the magazines for these photographs. An unexpected freak of nature gave him a corner on a particular market and he reaped the reward."

He later made a statement in his letter as follows: "A newspaper or magazine might readily pay \$1,000 for a set of photographs illustrating a happening of unusual interest provided they could get them at once, although in a few days the photographs would be worth

only ordinary prices."

Later I had a conversation with this gentleman and asked him to give me an incident explaining this rather large amount. In reply, he said that should a serious accident happen in the White House which could by any possibility be photographed, there would be no doubt of obtaining as high as \$1,000 for the pictures. Could any one have taken a photograph of President McKinley at the instant of his assassination, there is hardly any limit to be set to the inflated price which would be paid for its exclusive use. Clinedinst, of Washington, D. C., is said to have received over \$700 for the magazine rights of a series of pictures of President Roosevelt on horseback, of which the one here presented is the most famous. My readers will now appreciate the difficulty I have in making any exact statement as to prices.

When a trade-journal orders a set of photographs,

from \$1 to \$3 per print is usually the amount paid. The journal over whose editorial destinies I preside recently had occasion to use a series of photographs of the new East River bridge of New York. We sent a man with a photographer who picked out the views, and out of the eleven negatives we took nine photographs, paying therefor \$3 per print. The photographer thus pocketed \$27 as the result of one day's work, of which I suppose \$20 was clear profit.

In doing independent work,—that is, Free-Lance when not regularly employed by any newspaper, - it is usually wise to have an understanding as to what is to be paid you for your Space rates are usually acceptable if you photographs. have any number of pictures in one story, but to make one photograph and receive therefor in the neighborhood of 50 cents is not a particularly profitable undertaking. A monthly magazine which desires a series of pictures which are to be published for their beauty alone may easily be induced to pay from \$15 to \$25 per picture, provided they are acceptable.

I am very much afraid that I have told all I can in regard to the actual prices paid for photographs. more difficult the work, the better the pay, is a rule usually obtaining in commercial photography, but in press photography the pay is entirely proportionate to the news value of the resulting picture, regardless of

the difficulties of its production.

In sending in a bill to a newspaper or magazine for photographic services rendered, it is usual and customary to send a clipping of the printed illustration with the date of the issue or its exact title, with the date and page of publication. Some of the larger journals pay on acceptance instead of on publication, in which case bills should accompany the prints. curious feature in connection with this work is that commissions given by newspapers for certain photographs rarely bring the photographer as large a remuneration as do those pictures which he secures on his own account and brings to the editor, offering same for sale. It may be the psychological effect of the finished print which awakens the editor's sense of news cupidity, or it may be that he feels more at the mercy of the photographer who has his wares already for sale,—but

the fact remains as stated.

We have now finished as comprehensive a survey of the subject of press photography as our space will permit and must make an end. If I have indicated the field and its possibilities, the work is its own reward.

C. H. CLAUDY.

BOOKS

The only books dealing with press photography in

any way are as follows:

Photography for the Press. Edited by H. Snowden Ward. Illustrated. 1902. (English.) 50 cents. This is especially useful to readers in Great Britain, being unusually complete in its local information, permits to photograph public places, etc.

An Index of Standard Photograms. Compiled by H. Snowden Ward. About 700 pages. (English.) 1902. \$10, net. This is a monumental record of thousands of photographs available for publication in all parts of the world. It is intended for the use of editors, publishers and lecturers, rather than for the press photographer. Its information concerning copyright is a special feature.

Potes

As we go to press the sad news reaches us of the death of Edward L. Wilson, which took place at Vineland, New Jersey, June 23, 1903. A sketch of his life and work will be given in our next issue. By his passing, American photography has lost its most prominent exponent during the past forty years. Requiescat in pace.

,\$

Mr. J. Gaedicke, in the *Photographische Wochenblatte* of recent date, tells of an interesting comparative test of developers. Each new developer has its champion, and it is rather hard sometimes to get down to the real facts. In testing developers, it should be remembered that the plate which records the impression must be harmonious, that is, capable of giving a good tone value to the high lights, shadows and intermediate tones, and not too "contrasty" or too flat, as the case may be. A series of developers was made up and plates developed in them, which had been exposed under a sensitometer made of 16 steps or layers of onion-skin paper. The records were as follows:

The picture appeared in	Length of development	Last number visible	Intensity
Rodinal	3 minutes 3 2 3 2 4 5	13 13 13 13 13-14 13 13 13-14 13-14	moderate moderate, very clear moderate strong pretty strong little less strong very strong, very clear moderate strong very strong, very clear

The most rapid developer is metol, the slowest glycin, hydroquinone brenzcatechin; the most intense

negatives were produced by glycin, hydroquinone. adurol and pyrocatechin; the clearest by pyrocatechin, glycin and edinol. The keeping qualities of the solutions which are ready for use are excellent in the case of rodinal, but remarkable in the case of adurol. Amidol and ortol also keep well; edinol and pinakol will keep least of all. From the above experiments it appears that adurol and glycin do not receive as much consideration as they deserve, which is possibly due to the fact that the public is not sufficiently familiar with Adurol possesses the following advantages: (1) A solution of adurol ready for use and in the proper strength will keep perfectly white for a very long time, even when the bottles are only partially filled, and in this respect it is superior to the other developers, especially to edinol, pinakol and pyrocatechin; (2) Adurol is the quickest-working developer of those four developers which yield the best intensity, and it combines, in the highest degree, speed and intensity; (3) From the experiments it has been shown that adurol produces negatives which render more nearly correct light values than any of the other rapid developers; (4) It is superior to hydroquinone for the reason that it is not affected by the temperature.

4

The Camera, of Philadelphia, announces six interesting competitions for photographers, with \$540 in cash prizes and "Camera" silver and bronze medals. A circular announcing the particulars for contestants can be had on application to the Camera Publishing Company, 120 South Seventh street, Philadelphia.

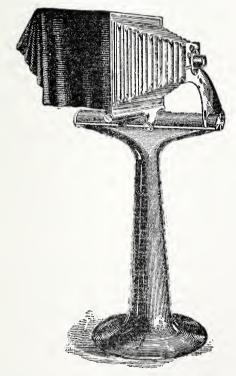


The subjoined illustration showing a new test camera for the examination of lenses, recently installed in the office of Taylor, Taylor & Hobson Ltd., St. James Building, New York, will doubtless interest our readers. In a letter accompanying the illustration Messrs. Taylor, Taylor & Hobson write: The camera is not for sale, but we have just made two for use in our New

NOTES 137

York and London offices, to enable visitors to compare the working of different lenses under similar conditions.

The average camera of today is, you will agree, so weak in design that there is, between the front and the back, a general want of truth and rigidity, which makes



it difficult to secure from modern anastigmats, such as Cooke lenses, the utmost sharpness of definition.

In any test camera it is essential that the axis of the lens be accurately at right angles to the plane of the focusing screen, and it was to insure this that we were led to design and make this form of camera. Some of its features may perhaps be suggestive to designers of

cameras for general purposes.

The lens holder and focusing screen are carried by a horizontal tubular beam which forms the head of the T-shaped column. As may be seen in the illustration, the axis of this beam and that of the lens and screen are not in the same vertical plane, but the latter is carried to one side, so that the weight of the lens and screen tends to rotate them around the axis of the beam.

This tendency to rotate is utilized to take up all wear or shake in the slides in the following way: Running along the beam are two projecting fins or ribs, one at each side of it, that on the near side being visible in the illustration as a longitudinal white line. Upon this rib, as may be seen, one foot of the lens-holder rests, while two other feet, which may more properly be described as claws, reach over to the rear rib and grasp it beneath, acting like the stock of a draftsman's square to keep the lens always square to the beam. This simple device has the virtue of a three-legged stool in being perfectly stable and free from rocking; it may be placed anywhere along the beam, and stays rigidly without clamping, wherever it is placed, while any wear of the feet is taken up automatically without tilting the plane of the flange-holder.

The bearing of the focusing screen on the ribs of the beam has the same arrangement of three feet, which hold it without rocking and maintain the perfect parallelism of the focal plane with the plane of the lens-holder. But to facilitate focusing, the foot which stands upon the front rib, as shown in the illustration, terminates in a roller which is rotated by the milled wheel to move the screen to and fro. Unlike a rack and pinion, this device has no backlash, nor is its freedom or accuracy

affected by dust.

To give the screen ease of motion, its two claws which engage beneath the rear rib are grooved, and the rib is grooved to receive balls, which form a ball-bearing, and which in their position beneath the rib are protected from dust. A lever is provided to lock the slide rigidly

after focusing.

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The test chart used with this camera is a large groundglass screen with geometrical squares and diagrams, illuminated from behind by electric light arranged to give brilliant and uniform illumination at all points on the test chart. Visitors to New York are cordially invited to call and see the test camera in practical use.

.2

The following table of Speeds of American Plates, for use with Wynne's Infallible Exposure Meter, is revised to date by Henry Wenzel, Jr., 237 B South 4th Street. Brooklyn, N. Y., and includes the new plates and films.

American Plate F 78	Eastman's Ex. Rapid Plate F 111-
Ansco Film F 90-	Forbes' L Plate F 23
Carbutt's B. 16 · · · · F 20	" S. & S. Ortho F 70+
	Hammer's plain and ortho plates:
Ortho Portrait 5. 23 F 32	Slow F 45
Polychromatic r 04	rast 78
" Negative Film S. 27 F 78	" Extra Fast F 90+
" Ortho Portrait \$.27 F 78	" Aurora Non-Hal, F 90+
" Eclipse F 78+	" Special(RedLabel)F 111
" Eclipse Junior F 78+	New Record Ortho F 78+
Cramer's single & d'ble coated plates:	" Extra Rapid F 90+
Contrast F 32	R. O. C. Plate F 78
	Rotograph Neg. Paper, Fast F 56
Slow Iso F 39	
Red Sensitive r	Seed's plain and ortho Plates:
Anchor	S. 23 F 78-
" Non-Halation F 78+	S. 20
" Medium Iso F 78+	" Non-Halation F 90+
Banner X F 90+	" S. 26 x F 111-
	" S.27 F 111
" Crown F 111	Standard Extra F 90
Eastman's Ordinary Film . F 90	Orthonon F 90T
" Non-Curling Film F 90+	" Imperial Portrait . F 111-
" "Kodoid Plate" F 90+	Stanley's S. 50 F 111
Rodold I late 1 90 i	

NOTE. + and - signs are to be disregarded; they merely indicate that plates so marked are slightly faster or slower than unmarked plates baving

the same speed numbers, although the results of both sensitometer and actual camera tests, are offered merely as guides to the speed numbers giving best results. It may occasionally be found necessary to use bigber or lower

numbers.

With characteristic foresight, Mr. Pirie MacDonald, "Photographer of Men," has installed in his studio, in the Washington Life Bldg., New York, the Cooper-Hewitt light which is being boomed in Europe as a remarkably effective illuminant for photographic por-The new light is practically equivalent to traiture. The new light is practically equivalent to daylight, as far as photography is concerned, and is said to give a more perfect rendering of photographic values than daylight. It is perfectly controllable and, of course, enables the portraitist to fulfil his engagement without regard to weather or atmospheric conditions.

A

English readers and those on this side of the Atlantic planning their holidays should invest 50 cents (2/) in the very attractive literature issued by the North-Eastern Railway, York, England, to inform tourists of the wonderful pictorial attractions of the English north country. By the courtesy of Mr. E. L. Davis. Chief Passenger Agent of the N. E. R., we have received a bundle of these illustrated booklets and can promise those visiting the northeastern part of England this summer a most delightful holiday with abundant opportunity for pictorial work. The handbook "Summer Holidays in North-East England," illustrated with about one hundred photographs by Payne Jennings, is a very complete guide to these picturesque nooks and corners; while the cyclist will find his needs fully covered in the "Cyclist's Guide to North-East England," a book of 136 pages. Apart from these, and containing detailed information concerning available rooms and board, railroad facilities, etc., are several booklets, carefully compiled and correctly illustrated. The service offered by the North-Eastern Railway, as we know by experience, is not surpassed by any other railway in Great Britain, and we commend its facilities with pleasure.

Books and Brints

PICTORIAL COMPOSITION AND THE CRITICAL JUDGMENT OF PICTURES. A handbook for students and lovers of art. By Henry R. Poore, A.N.A. pages; profusely illustrated; 6½ x 10 in.; \$1.50, net. New York: The Baker & Taylor Company.

We have read this book with a great deal of pleasure and satisfaction. Despite the numerous works on picture-making by photography, we have shared the common desire for a reliable guide to the perplexities of composition, which would unite direct instruction with a proper understanding of both the painter's and the photographer's point of view. Mr. Poore's book seems to meet these requirements in a peculiarly happy way. It combines all that we found helpful, years ago, in Burnet's classic Essays with the best of what may be found in the works of Emerson, Robinson, Hinton and

others who have written for photographers.

Mr. Poore is a painter, with a keenly appreciative insight of the possibilities and limitations of photography as a medium of pictorial expression. This is plainly evident in his treatment of the fundamentals of composition, the numerous references to photography, and especially in his analysis of the illustrations accompanying the text. We particularly call the reader's attention to the chapter on Unity or Balance, which, to our mind, is the clearest exposition of this principle and its vital importance in the literature of the subject. Here, as in other sections of the work, Mr. Poore employs numerous illustrations to illustrate principles already stated, instead of deducing rules from selected examples, as is usually done in text-books on picture-mak-This method is most commendable, as enabling the student to apply the principles to all kinds of subjects, rather than giving simply an understanding of the example under discussion.

In its style, clear and explicit, the interest of the subject is well sustained, and the reader will find it difficult to lay the book down without at least finishing the chapter which first engaged his attention. The volume is well arranged, and typographically most attractive. We commend it to all earnest picture-makers as emphatically the most satisfactory book on the subject at present available.

.4

THE FIGURES, FACTS AND FORMULÆ OF PHOTOGRAPHY, and Guides to Their Practical Use. Edited by H. Snowden Ward. 165 pages; 5 x 7½; paper covers, 50 cents; cloth-bound, \$1. Published by Tennant & Ward, New York, and Dawbarn & Ward Ltd.. London.

The usefulness of this book may be gauged by the fact that, although published only a few weeks ago, it has already passed through two editions. Briefly, it comprises over a thousand carefully-selected formulæ, methods, tables, recipes and "short cuts," covering every branch of photography and arranged in sections for convenient reference. Its compilation must have been an immense labor, involving reference and crossreference to scores of sources of information. As an example of extreme condensation, combined with clearness and directness in explanation, F. F. F. bears eloquent testimony to the skill of its editor, to whom we extend our congratulations upon the appreciation given to his labors. Unless we are much mistaken F. F. F. will take its place on the photographer's bookshelf as one of the most useful of photographic reference books.

Note.—Since the foregoing was written the paper-covered edition has disappeared and only a few of the cloth-bound copies remain on hand. [Publishers.]

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INSTRUCTION IN OZOTYPE. New methods and formulæ. By Thomas Manly. 1903. 48 pages; paper covers; 15 cents. New York: Tennant & Ward.

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The simplification of Mr. Manly's beautiful process of pigment-printing has necessitated a complete revision of the earlier manuals. The booklet here noticed gives clear and explicit directions for the production of perfect prints with a minimum of difficulty or failure. We trust that, with the added attractiveness thus given to the method, ozotypy may rapidly become as popular in America as it is in Europe. As a simple means of producing permanent prints in any desired color, without the usual transfer and safe-edge bothers incidental to other carbon processes, ozotype deserves to be more widely known and appreciated.

DIE PHOTOGRAPHISCHE KUNST IM JAHRE 1902. Edited by F. Matthies-Masuren. 189 pages; illustrated; 81/2 x 12 in. Price, 9.50 marks. Published

by Wilhelm Knapp, Halle als Germany.

This is a new German annual, corresponding to "Photograms of the Year," reproducing selected pictures by prominent photographers, amateur and professional, and giving a few interesting papers on photographic subjects, by European writers of note.

Readers of German may be interested in the following text-books recently published in that language.

DAS PHOTOGRAPHISCHE PIGMENT VERFAHREN [Carbon Printing, Photogravure, Artigue and Ozotype methods]. By H. W. Vogel. 4th edition, edited by Paul Hanneke. 124 pages; paper covers; 3 marks.

DIE RETOUCHE VON PHOTOGRAPHIEN [Retouching and Coloring in Oil and Water-colors]. By Joh. Grasshof. 9th edition, edited by Fritz Loescher. 130 pages; paper covers; 3 marks.

DIE ARCHITEKTUR-PHOTOGRAPHIE [Architectural Photography]. By Hans Schmidt. 140 pages; illustrated; paper covers; 4.50 marks.

VERGROSSERN UND KOPIEREN AUF BROMSILBER-PAPIER [Enlarging and Printing on Bromide Papers]. By Fritz Loescher. 105 pages; illustrated; 3 marks.

PHOTOGRAPHISCHE BEI KÜNSTLICHEM LICHT [Magnesium Light Photography]. By Dr. E. Holm. 135 pages; illustrated; 3 marks.

DER GUMMIDRUCK [The Gum-bichromate Process]. By J. Gaedicke. 2d edition; 85 pages; illustrated; 3 marks.

DIE TROCKENPLATTE. [An advanced text-book on the properties and treatment of dry plates.] By Dr. Luppo-Cramer; 98 pages; illustrated; 3 marks.

LEHRBUCH DER MIKROPHOTOGRAPHIE. [A revised digest of the author's earlier work: PRAKTIKUM DER WISSENSCHAFTLICHE PHOTOGRAPHIE, a handbook on photo-micrography.] By Dr. Carl Kaiserling. 176 pages; illustrated; 4 marks.

The above are new volumes in the "Photographische Bibliothek," a series of handbooks similar to THE PHOTO-MINIATURE series, but more bulky by reason of the larger type and heavier papers used. Published

by Gustav Schmidt. Berlin.

JAHRBUCH DES PHOTOGRAPHEN UND DER PHOTOGRAPHISCHEN INDUSTRIE. Edited by G. H. Emmerich. 400 pages. Published by Gustav Schmidt.

Berlin. No price given.

This is a new year-book, giving a review of apparatus and material introduced in 1902; receipts and formulæ; legal information for German photographers; lists of societies and dealers.

ENTHUSIASTICALLY PRAISED BY THE PHOTO-GRAPHIC PRESS AND READERS EVERYWHERE. A BOOK OF UNUSUAL INTEREST AND USEFULNESS

PHOTOGRAPHIC LENSES A Simple Treatise by Conrad Beck and Herbert Andrews

288 pages, $5 \times 7 \frac{1}{2}$, profusely illustrated with halftones showing comparative results obtained with different lenses and many diagrams in the text, marginal index, etc. Two editions: Red cloth, 75 cents; and de Luxe (a few copies only) in superior binding, with photogravures, etc., \$1.00

This book is different in that it was written and illustrated by two well-known makers of lenses. It covers every point of possible interest in the choice and use of photographic lenses of all kinds for all classes of work. Thus it may be said to contain the essence of all other books on the subject

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Poco Hand Cameras,
View Cameras, all grades.

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ROCHESTER, N. Y.

START RIGHT

ALFRED WATKINS ON THE FUTILITY OF BROMIDE FOR OVER-EXPOSURE

In our printed matter regarding the Kodak Developing Machine we have frequently had something to say about the futility of the use of bromide as a restrainer after development has once gotten under way; have stated that the temperature and length of development give to the operator all the control required. Mr. Alfred Watkins, in a recent letter to the "British Journal of Photography," puts this matter very happily. He says:

"There is nothing whatever in my method which prevents me, should I so desire it, from altering the proportions of the developer before I pour it on, and thus securing the "holding back" power of the lower tones which bromide confers. But experience shows that such additional method of control is only useful for great over-exposure, and as in order to exercise it I must be aware of the over-exposure before I pour on the developer, the conclusion forces itself upon my perhaps over-practical mind that I might just as well be aware of the over-exposure a little earlier still, and give the plate a correct exposure instead."

He has hit the nail squarely. If one must know beforehand that a negative is over-exposed in order to control development, why not go back just a little farther and start

right by exposing correctly?

Time development has come to stay. It would have come anyway, but the Kodak Developing Machine has forced the issue. The regularity with which it turns out negatives of a quality superior to those obtained by the old methods is an unanswerable argument. Of course the wide latitude of Kodak Film has helped, because it makes the starting right—the giving of a "correct exposure" easy. The new method will not give a good negative from a snap-shot with a small stop, made in the woods, nor from a time exposure made upon a sun-lit marine—neither by any possibility could the

The Kodak Correspondence School gives the individual criticism of an expert on each negative and print submitted. That ought to be worth a dollar.

ROCHESTER, N. Y.

old method; but within the wide limit of the film, timed machine development gives better printing negatives than are secured by the old method. Thousands are proving it by their work.

PHOTOGRAPHIC COMPETITIONS

For the benefit of those interested, we will give here, each month, a bulletin of the important photographic contests in progress throughout the United States.

BAUSCH AND LOMB OPTICAL COMPANY, Rochester, N. Y. International competition. \$3,000 in prizes. Closes October, 1903.

C. P. GOERZ OPTICAL WORKS, 52 Union Square, E., New York. Cup competition for professionals. Closes August 1, 1903.

C. P. GOERZ OPTICAL WORKS, 52 Union Square, E., New York. International competition. Open. \$1,500 cash prizes. Closes June 30, 1903.

LESLIE'S WEEKLY, 110 Fifth Avenue, New York. Weekly competitions, open to amateurs. Prizes, \$10, \$5, \$1.

BUFFALO EXPRESS, Buffalo, N. Y. Continuous contest. Prizes, \$5 to \$2, weekly.

RECREATION, 23 West 24th Street, New York. Eighth annual amateur competition. Forty prizes in photographic and sporting goods. Closes November 30, 1903.

LADIES' HOME JOURNAL, Philadelphia. Pictures of rooms or churches decorated for weddings. 10 prizes aggregating \$200. Contest closes July 1, 1903.

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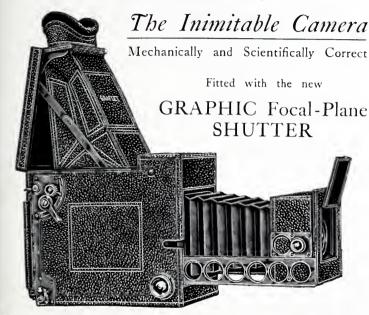
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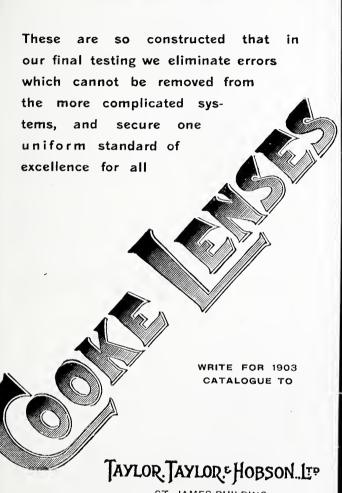
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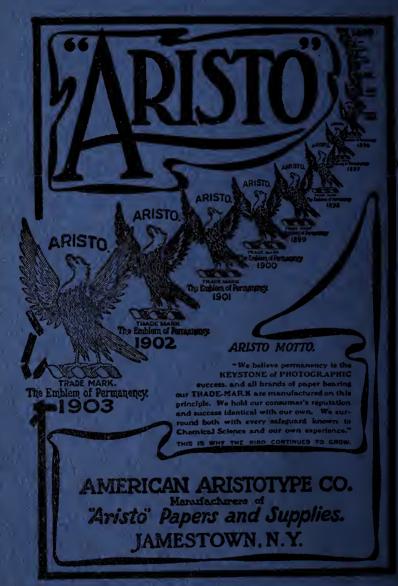
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STUDIO CONSTRUCTION

In the designing and construction of a studio - or gallery, as the old name had it - we have a problem which has puzzled photographers since photography began, 1830 is by common consent the birth year of practical photography, and in 1840 were filed the first specifications claiming patent rights for an invention in studio construction - the glazing of an inclined roof with blue glass! Since that time patent claims have fluttered thick and fast on the governments of two hemispheres, and a few belated leaves are still falling. While photography was in its infancy, before the rapidly dying spirit of trade jealousy arose, the proper construction of the glass house for portraiture was a favorite theme for discussion among photographers, and their associations gravely appointed committees to debate the matter. From these debates came model designs which, to the simplicity of these later days, appear masses of complexity. Quite forty years ago the journalists of the craft, foreshadowing the British Journal's weighty leaders on "Studios, Past and Present," began to hash up ripe experience and old information on the subject as of perennial interest to their The hash is yet on, and still photographers want to know. Few questions come to the editor of a photographic journal so regularly as those relating to the construction or modification of skylights. As Mr. H. P. Robinson observes: "It is a peculiarity of photographers to invent modifications." And it would seem that the simpler the detail in question, the more frequent and persistent are inquiries concerning it.

It is, however, only natural that the photographer should want to know about his workshop—for such the studio is: the place upon which depends very largely his success. It is true that the skilled workman can produce good portraiture with almost any form of studio, but the fact remains that the design and arrangement of the photographer's skylight govern, for good or evil, the general quality of his output.

The man who has not had practical experience under the skylight, and especially the modern amateur who comes into the profession unfettered by its traditions, is apt to wonder at all this worriment about what is, after all, merely a room with an unusually large window. But when such a man attempts portraiture in a makeshift studio, his wonder ceases; he begins to suspect some fetish or mystery about the glass house, and his curiosity awakens concerning those studios from which comes work compelling his admiration by its superb technical qualities. Says the ultra-conservative Emerson, in his Naturalistic Photography: "For portraiture, a studio is necessary if we seek the best results; . . . provided it be large enough and light enough there is not much else to consider. Successful portraits can be made in ordinary sitting-rooms, but we do not think the best results can be obtained in this way, because of the inferior and comparatively ill lighting. There are doubtless rooms in private houses as good as any studio, but such cases are exceptional." Finally, winding up his chapter, he adds: "Make the studio as much like an ordinary room as possible, and hide the tools of the trade." Here we have briefly put the whole philosophy of studio construction; for the majority of men, however, the subject needs considerable elaboration.

It is a curious fact that, although the photographer of today has the advantage of some sixty years of experiment in studio-building, few photographers regard their skylights with complacency or even with a reasonable measure of content. I have known men who have built three or four studios, embodying in each successive attempt all the wisdom their experience could suggest; but I have yet to meet the photographer who

would not make radical changes, if he were to rebuild his studio tomorrow. A glance over the innumerable forms and variations employed during the past twenty years of the dry plate affords an interesting demonstration of this discontent. Apparently, the subject is without finality. But there are fundamentals which, subject to modifications necessitated by local conditions, are common to all studios. These offer a profitable field for our consideration. In this monograph I purpose to set forth these fundamentals and such other information as may be helpful to those who are about to build new studios or desire to remodel existing structures. Especially do I hope to gather herein information useful to those who are unable to visit other studios in search of ideas, or to obtain the practical help of an architect experienced in this special branch.

First, a word or two about the choice Location of a location, an important detail neces-

sarily preceding the actual work of construction. Broadly speaking, this is determined by individual circumstances, business considerations or other local conditions which cannot be put aside. First, the location of the studio from a business point of view must be considered; then the location of the work-room itself, whether on the ground floor or higher; and, finally, its aspect as influencing the vital factor of illumination—the worker's point of view.

Little definite instruction can be given The Business on the general location of the studio Point of View from a business point of view, as this will vary considerably according to the size of the town, the class of trade desired and the amount of capital to be invested. In these days of specialists, also, the peculiar requirements of the special line of work proposed will influence the photographer in his choice of location. The size of the town and the amount of capital invested will usually settle the question whether the studio shall be prominently located or hidden away in a business building or on a side street. That the studio must be easily accessible to the class of patronage sought, is obvious. The photographer in a small town may accomplish this by building on a corner lot in a desirable section, residential or business quarter, as his preference may decide. Or he may occupy a floor in a business building; or a suite of rooms on the main thoroughfare; or it may be that he can find a small store-building near the post-office or other public resort, which will afford opportunities for the prominent display and facilities for his work. There is a growing tendency, justified by results even in small towns, to locate in a good residential quarter rather than on a business thoroughfare. The detail is important, as bearing upon another question, viz.: Shall we build upon the ground floor or occupy the top floor of an existing building?

To the photographer in the large city, location is almost wholly a question of capital, with the class of trade desired as close second for consideration. Given the price in hand, the big city offers glowing possibilities. Those who seek the trade of Fifth Avenue or South Kensington must first secure capital sufficient to overcome the inertia of such localities, represented by rentals and ground values. In this way, the class of business desired and capital are united as the factor of chief importance in selecting a location. The ways in which the problem is handled are as numerous as the instances involved. Hollinger, seeking the business of upper Fifth avenue, occupies the top floors of a store-building, putting in a skylight of approved form to meet his technical requirements. Mrs. Käsebier, seeking a more exclusive patronage and working along different lines, takes the top floor of a converted residence, disregarding almost wholly the conventional studio requirements. Falk, combining artistic possibilities with commercial enterprise and ample capital, occupies a large section of the top floor of the Hotel Waldorf-Astoria, building there a model establishment uniting beauty of design and every convenience essential to good work. Pirie MacDonald, specialist in the portraiture of men, occupies a suite of rooms in a downtown office building, doing his work by the light of two windows having a northeast aspect, or, later, with the Cooper-Hewitt light, independent of daylight and weather. Fry & Son, seeking the patronage of



From a print on parchment tissue Gertrude Käsebier



ALVIN LANGDON COBURN
From a portrait on parchment tissue
Gertrude Käsebier

British aristocracy, built a ground-floor studio in fashionable South Kensington; while Hana, Ltd., catering to the theatrical profession, are located in Bedford street, off the Strand, one of London's busiest thoroughfares. These variations might be multiplied indefinitely.

As already mentioned, the general Ground Floor location of the studio will determine whether it shall be on the ground floor or on an upper floor of the building. As Mr. MacDonald has demonstrated, and as we see in Fig. 10, which roughly represents the exterior of a successful English studio, it is not essential that the studio shall be located either on the ground floor or on the top floor. But usually, one or the other has been chosen, from time immemorial. Where all the circumstances are favorable, which rarely happens, the ground floor is always desirable as affording ready access for visitors. A possible improvement, often neglected until it is too late, is to erect a building with two stories of moderate elevation. The lower floor is devoted to the receptionand work-rooms, with ample space for display or exhibition purposes, and the studio proper occupies the upper floor, with its retiring-rooms, etc. The advantages of this plan are many, and in the smaller cities there is no reason why the two-storied studio should not become general. It is, to all intents and purposes. a ground-floor studio, but lifted a little above the dust and noise of the street. In all such instances the stairway leading from the reception-room to the studio proper should be made a special feature, well proportioned and designed to add attractiveness to the reception-room. By skilful placing of a window the landing on the upper floor can readily be made to afford opportunity for "home portraits" of children and the like. But we digress. The chief difficulty involved in the ground-floor studio, as we shall see, is the possibility of the light being obstructed.

In the larger cities, people naturally associate the photographer's studio with the weary climbing of narrow and poorly lighted stairways. This association has, in the past, too often been justified by the fact; but the evolution of the elevator, or "lift," as our English

cousins prefer to call it, is fast falsifying this ancient tradition. It is not economy, but the need of an unobstructed light, which drives the photographer skyward. Where this is obtainable without stairways or elevators, no trouble should be spared to secure the advantage. When an upper floor in a high building is the best location obtainable, an effort should be made to have the building equipped with an elevator, even though this add to the rental. In these days of automatic household elevators, the cost involved is not prohibitive, and the pecuniary advantages will more than repay the expenditure on an average lease. When an elevator is out of the question, it is important that the photographer should control the stairways and, if possible, undertake their maintenance, as a vital factor in assuring a good impression and the comfort of his patrons.

The ideal light for photographic por-Obstructions traiture is that coming from the north or northeast, and it should reach the studio without obstruction or interference of any kind. the construction of ground-floor studios, even in small towns, this detail is not always easily controllable. Near-by trees, tall buildings and the ungainly telephone standards peculiar to small towns, are the principal sources of difficulty. Sometimes the erection of a building after the completion of the studio will necessitate structural alterations, or even removal; such a contingency should not be overlooked in the selection In cities where soft coal is used, - more of a location. common in Europe than on this side of the Atlantic,a remote factory smoke-stack may prove seriously detrimental to comfortable working. Thus, a studio which under normal conditions appears to have a clear, unobstructed aspect, may, by a change of wind, suffer a steady veil or pall of smoke, making necessary continuous changes in exposure. Referring to such a case, Mr. M. A. Seed points out that a yellowish tinge in the atmosphere, caused by smoke or similar local and temporary conditions, is often responsible for unexplained underexposure complained of by experienced operators. The detail is one which needs only to be mentioned to suggest its remedy.

The necessity of a clear, unbroken light-aspect being well understood, one may ask to what extent will a near-by chimney, tree or building be detrimental to the proper illumination of the studio? If the height of the obstruction, above the studio floor, be not more than one-quarter of its distance from the studio, we may safely assume that it does not interfere with the light. This is a simple rule and worth remembering. Thus, an obstruction 30 feet high and more than 120 feet away will not affect the light at our disposal. We are here considering the studio as built upon the ground. In proportion to the elevation of the studio floor above the ground, so do outside obstructions interfere less and less with the illumination of the studio. Thus, where a near-by building overhangs the skylight more than this rule allows, considerable advantage can be gained by raising the studio six feet, which will be equivalent to placing the obstruction twenty-five feet farther away. This is a point in favor of placing the studio on the second, instead of on the ground floor of a two-storied building.

There are town studios in successful operation where buildings so closely surround the skylight as to largely destroy its normal efficiency. In such cases, success depends upon the photographer's ingenuity in overcoming what, ordinarily, would be a fatal defect in the light. Mr. George G. Rockwood, in his ground-floor studio on Broadway, worked successfully for years with such an obstructed light—against sound theory and common sense. Undoubtedly his present second-floor studio gives him much more comfort and satis-

faction.

If the obstruction is a wall or building very close to the studio, such as is often erected after the erection of a studio, the difficulty of reflection is added to loss of light. Here we face one of the most difficult problems encountered by photographers. Sometimes the whitewashing of the offending wall will mend matters; at other times a dull neutral coloring will offer advantages. When a yellow or red brick wall of considerable height is built near a studio, the shortest way to peace and comfort in one's work is to abandon the

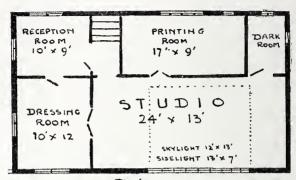
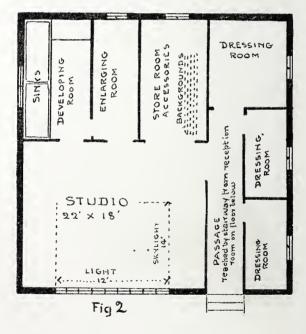


Fig 1



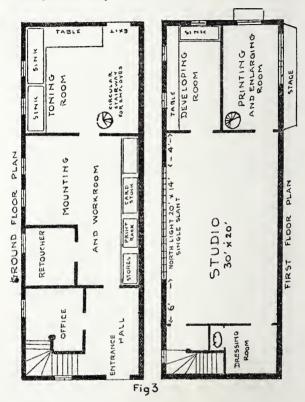
studio, or to adopt artificial illumination. The new Cooper-Hewitt light, with its remarkable actinic power, seems to offer a desirable remedy for such evils.

The location of the studio building Disposition having been satisfactorily determined. of a Floor the disposition of the floor-space must be considered before we can proceed to the construction of the studio proper. The arrangement will necessarily depend upon the space available and the requirements of the business. The shape of the floor may be irregular; it may be possible to arrange all the rooms upon a single floor, or two floors may be necessary or desirable. The two-storied building, erected for photographic use exclusively, solves the problem When the studio is located in a most effectively. business building, it is often desirable to secure a room on the ground floor for display purposes and to serve as an office where appointments may be made or orders taken. Where the studio occupies the top floor it is often possible to erect an additional sub-story on part of the roof, which may be utilized for the printing and finishing departments. In Fig. 1 we have a groundfloor plan for a small studio built upon the ground, or occupying a floor in a business building. In Fig. 2 is suggested the ground plan of a top-floor studio. we have more space at our disposal, the general reception-room being located on a lower floor, with workrooms on the roof extending over one-half of the plan shown, leaving a clear sky-space over the studio itself. Fig. 3 suggests the arrangement of a two-storied building running east and west on a side street, with an unobstructed north aspect and entrances at the east and west ends. The disposition of the rooms is self-These diagrams are offered simply as sugexplanatory. gestions and may be modified to suit local conditions. They are based on existing studios, although here and there I have departed from actual details in arrangement.

Planning the Studio

The construction of a studio in a large city is necessarily so complicated by local conditions and surroundings that it is impossible to deal with it here except in a general way, as indicated in preceding pages. The structural

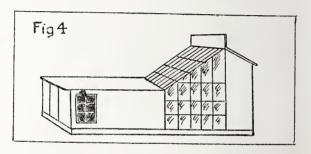
alterations called for in existing buildings, the requirements of local building by-laws, and the amount of work permitted by the terms of a lease, all interfere



with the realization of one's ideals. Compromise is general and inevitable. For these reasons the photographer wisely calls for the aid of a competent architect, to whose experience he joins his knowledge of his requirements and of existing studios built under condi-

tions similar to those with which he has to deal. In this way he gets, in the end, a studio in which he can produce good work with comfort, and which will satisfy his immediate needs. The man who does not know how to set about his studio building is generally the man whose resources and requirements are alike small. Sometimes the photographer in a small town will give his chief attention to economies of cost and plan his studio alone. In such cases the work of construction is begun before its completion has been fully thought This means that, when the work is perhaps half completed, difficulties will be encountered which will cause delay and add unlooked-for expense. It is well, therefore, whether the enterprise in hand is large or small, to have every detail clearly in mind and worked out in black and white, with estimates of cost at hand, before the work of construction is actually begun. These details chiefly concern the size and proportions of the studio, the relative size of the light and whether it is to be double, or single, slant, its angle of inclination, the construction of the frame carrying the light, glass and glazing, the roof of the glass house, entrances, exits, etc. These we will consider in detail as we reach them, but first let us look at the development of skylight construction in a general way, from its beginning to the present day.

The earliest requirement in portrait Evolution of photography was a well-lighted room the Studio open to the direct rays of the sun -a south-light studio, in fact. In Daguerrotype days exposures of six minutes were the rule even with sunlight. Later, the advent of "accelerators" and the perfection of the process reduced the exposure time to two or three minutes, but sunlight was still desirable. The rush of visitors to the studio on sunlit days is probably due to a lingering remembrance of those early times. Instead of the screens now used to soften the glare of the skylight, reflectors were used, the cry being always for "more light." With the introduction of wet collodion and more rapid negative processes, photographers began to consider the desirability of a light more equable and softer than direct sunlight. Following this line, they turned their studio window to the north, and the whirligig of time found them ever contriving blinds and shades to cut off stray sunbeams. First, the "tunnel" studio, probably unknown even by name to the present generation, became popular. A sketch of such a studio is seen in Fig. 4, which represents Waterhouse's modification of the original form introduced by Monckhoven. In this form of studio the photographer compromised the advantage of a north light with the necessity of abundant illumination. Instead of running east and



west, as our modern studios do, the tunnel studio extended north and south, and the subject seated under the ridge faced directly north, thus receiving all the available illumination. The skylight, extending the full width of the building, sloped from the ridge to about five feet from the ground. From this height of five feet the studio extended northward as a low rectangular box or tunnel. In this cramped space the photographer crouched behind his camera, with what discomfort may be imagined. There were several problematical advantages attaching to the tunnel studio, such as the directness and intensity of its illumination. Equally obvious disadvantages caused its abandonment when the problem of lighting the subject became less troublesome, and, apart from its usefulness for copying and reproduction work, the once-popular tunnel studio may be written down as extinct. Since it disappeared from view there have been studios of almost every con-

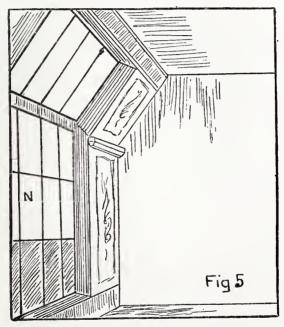


From a sepia platinotype Gertrude Käsebier



By Gertrude Käsebier

ceivable form and design, out of which has been evolved the simple north-light studio of today. It will be interesting, before taking up the construction of presentday studios, to glance over a few of the studios of the past, noting their curious variation from the general plan.

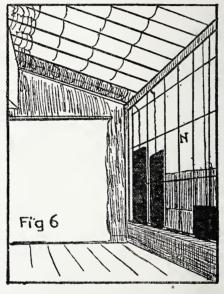


Various Forms

In Fig. 5 we have a sectional view of a studio built during the sixties by Notman, of Montreal, who was famous for the wonderful quality of his portraiture. Except for the heavy transom joining the side- and top-lights this form is practically equivalent to the single-slant light of today in its capacity for illumination. Like the single-slant, it necessitated a generous amount of floor space, the studio being 35 feet long by 18 feet wide and 17

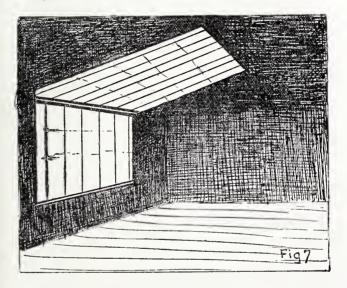
feet high from the floor to the ridge at the top of the skylight. In order to get good modeling with such a light it would be necessary to place the subject not less than 8 feet from the side-light, so that the studio would hardly give the best results when large groups were required.

'Fig. 6 represents a studio built by Reutlinger, of Paris, but does not show the entire width of the room,



which measured 15 feet, with an extreme length of 30 feet. The arrangement of the side- and top-lights was peculiar in that the side-light for a distance of 4½ feet from the base was of stained glass, to subdue the lighting on the lower part of the figure in a portrait. The balance of the side-light, extending another 4 feet to the transom, was of white plate glass, while the whole of the top-light was slightly stained, to soften the intensity of

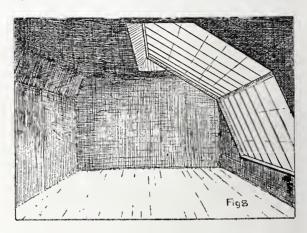
the light. Apparently the illumination thus gained was difficult to manage, as the skylight was equipped with an elaborate system of blue and opaque curtains. This form cannot be said to offer any advantages, but is interesting as showing how far the skilful operator of olden days was independent of his skylight when it was de-

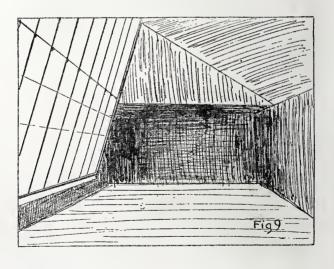


fective and managed to produce creditable work under

many disadvantages.

With the development of the wet collodion process, the desirability of lowering the top-light and giving it a comparatively flat inclination became apparent. Fig. 7 represents a typical skylight of this period, which form was generally adopted during the later years of wet collodion, preceding the introduction of the gelatine dry plate. With this form of skylight construction the head and bust in a portrait received the strongest illumination. That genius for the invention of modifications peculiar to the photographer, according to Mr. Robinson, did not per-







From a print in sepia platinotype Gertrude Käsebier



By Gertrude Käsebier

mit this form to go unchallenged, however, and in Fig. 8 we have a skylight which met with the support of a few enthusiasts early in the eighties. Here the skylight is inclined at a greater angle than in the previous form and the side-light has a decided slope. This form was said to offer many advantages in obtaining "Rembrandt" and statuesque effects popular at that period. Mr. James Landy, of Cincinnati, was probably the most earnest advocate of this style of studio construction, which, in his hands, seemed capable of almost any desired effect in lighting.

Modern
Skylights

By an easy transition the sloping sidelight and steeply pitched top-light gave
way to the single-slant seen in Fig. 9.

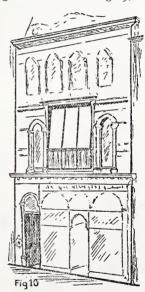
which represents a doubleslant light studio "made over" to the single-slant light form. In this diagram the slant is brought down much nearer to the floor than is usual or desirable, the singleslant lights of today generally starting at about three or four feet from the floor and extending twelve feet to the ridge, coming into the room four feet at the top of the light.

A First-floor Studio

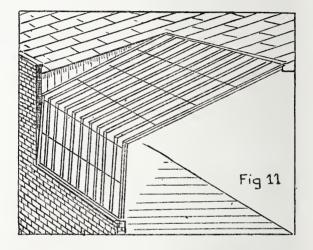
Studio

In Fig. 10
I have roughly sketched a novel adaptation of the single-slant light form of construction, made by an English photographer who had grown weary of the top floor. Judging by examples of work from this studio on the first floor, the experiment has proved successful. The photographer

gives account of his experience as follows: "Since I first made the plunge from top floor to first floor, I have found my single-slant light very easy to work,

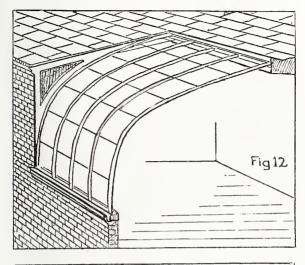


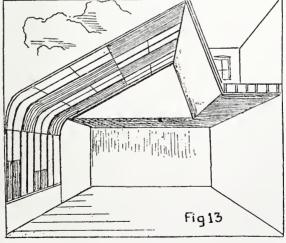
as every blind can be opened or closed in a few seconds. Having no skylight, I find the studio delightfully cool on the warmest day. My visitors have only a single flight of stairs to climb and, I am glad to add, find no fault with my present work in comparison with that done in my old studio. While I do not claim that I can now produce better work than my co-workers, I find myself able to produce better work than ever be-



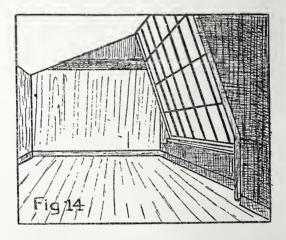
fore, with half the trouble, and I have not found any increase of exposure necessary, which I feared. I might add that the building opposite the studio is at least as high as my own, and that the street on which I am located is about seventy feet wide. I was somewhat afraid that the opposite building would over-shadow my light, but this has not proved so in practice.

Hayes'
Lights
In Figs. 11, 12 and 13 we have the standard form of the double-slant light and two variations. These are copyrighted designs by Mr. George Hayes, by whose permission I am able to include them here. Mr. Hayes





has probably a longer experience in skylight construction than any other man in this country, so that his designs may be accepted as models of their class. The Hayes lights are constructed of metal throughout, by which rigidity of frame and a minimum of light obstruction are secured. From the many forms of metal rafters for skylights given in the Hayes catalogue, Fig. 21, on a later page, is selected as typical of modern construction. The construction seen in Fig. 11 is representative of perhaps six-tenths of the skylights to



be found in this country and Europe. It has been found to meet all the requirements of portraiture, whether single figures or groups. The slight slope given to the side-light is said to be an improvement over the vertical side-light, in that it carries rain or melting snow into the gutter at the base of the light, rather than permitting it to shoot off the skylight at an abrupt angle. The advantage of the curved segment joining side- and top-lights is obvious, although this form of construction does not allow of as much head-room in the studio as does that shown in Fig. 11.

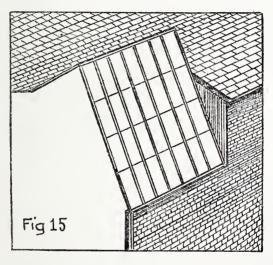


FATHER HUNTINGTON
From a portrait in platinotype
Gertrude Käsebier



FATHER HUNTINGTON From a gum-bichromate print Gertrude Käsebier

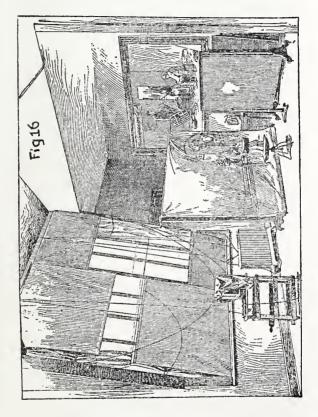
The Single-Slant Light mentioned on an earlier page. Exterior and interior sectional views of such a light are seen in Figs. 14 and 15. This form has been widely discussed during the past eight years, and single-slant skylights are now fairly numerous in this country, although comparatively uncommon in Europe. As we have seen, it is a natural transition from the sloped side- and skylight of



fifteen or twenty years ago, and illustrates the modern tendency to simplify work-room methods. Mr. James Inglis, in his "Artistic Lighting," a book which is largely responsible for the popularity of the single-slant light, fairly describes its advantages as follows: "It is the simplest and cheapest to build, the least liable to get out of order, and will withstand the winter's snows and summer's hail better than any other form. In portrait work it will give any result that can be secured by any other form of light, and many effects that can be got by

So, after a long and varied experience in operating-rooms, I unhesitatingly cast my vote in favor of the single-slant light." The typical example of the single-slant light studio advised by Mr. Inglis is seen in Fig. 16. He says: "The light should start about five feet (two feet would be better for figures) from the ground and extend to a point not higher than fourteen feet from the floor. Its width may conveniently be about ten feet; more than this I consider simply a weariness. In the matter of glazing, I confess to a weakness for ground glass. It is especially a benefit in cloudy weather, for at such a time a light, fleecy cloud will frequently take up a position in the blue sky where it will reflect a distinct light on the very spot of all others on which it is not wanted. The curtains should be absolutely opaque and arranged in pairs, working from top and bottom on spring rollers and sufficiently long to overlap about one foot when closed. In my own studio the light is ten feet wide, controlled by four curtains, two top and two bottom, each of the pairs overlapping six inches. At the very outside, no more than half a dozen curtains are necessary for such a light."

The advantages and disadvantages of the single-slant have been much debated Comparisons without practical benefit. Mr. George G. Rockwood has pointed out that, although new in form, the single-slant gives precisely the same illumination as the "hip" or double-slant light, as this is generally used by photographers, viz., with a few feet at the ridge of the skylight and a few feet at the base of the side-light screened or curtained, so that only the upper half of the side-light and the lower half of the top-light are employed. From this viewpoint, the advantages of the single-slant are resolved into simplicity of construction, ease in maintenance, and the absence of the transom or obstructing beam joining the side- and top-light. The single-slant also assures practical freedom from sunlight in the studio - an obvious advantage. On the other hand, it requires a studio much wider than is often practicable and is perhaps a little more difficult to handle for some branches of work, such as large studio groups, than the familiar double-slant light. Thus, in order to get desirable modeling in the subject, it is necessary to place the sitter at least ten feet from the light; less distance giv-



ing predominance to the side-light with strong contrasts, the top-light going over the head of the subject.

The size of the studio is perhaps the vital factor in the decision between single- and double-slant lights. For studios twenty-five feet long and fifteen feet wide, or smaller, the double-slant light is preferable, as easier to handle, giving a broader illumination and permitting us to work closer to the light. Where a generous width of studio is practicable, however, the advantages of the single-slant come into play; thus, for a studio not less than twenty feet wide, the single-slant form may be employed with confidence. This leads us to the consideration of the comparative size of a studio and its light, which we can now discuss intelligently.

Given an unobstructed light, a room Size of the running east and west, not less than Studio twenty-five feet long and fifteen feet wide, will suffice for ordinary portraiture. Many studios are smaller than this. For groups and composition work, of course, more room is desirable. room thirty feet long by eighteen feet wide gives ample space for almost every requirement. When a singleslant light is favored, and group work is to be made a feature of the business, it may be well to consider twenty or even thirty feet as a better width. Under ordinary circumstances, a studio of this width would simply allow an amount of unused space, favoring the accumulation of backgrounds, accessories, and other studio equipment which would better be kept out of the studio altogether. Where a room of exceptional width is available, it is well to erect a temporary or removable partition, making a separate long room at one side which can be used for the storage of accessories and the like, which room, if the occasion requires, can be added to the working space of the studio.

The Lens as a Factor feet wide will give ample room for full-length figures and permit the use of a length of the lens will often determine the length of the studio. The untruthfulness and distortion arising from the use of lenses too short in focal length are becoming more and more obvious, so that the tendency is toward the use of lenses of greater focal length than those hitherto employed. In order to avoid disagreeable distortion in the portrait, it is necessary that the lens used

should have a focal length equal to twice the longest side of the plate to be covered. For accurate drawing in large half-length or bust portraits, it is desirable that the focal length of the lens should be three times the longest side of the plate used.

As an aid in this, I make room here Beck's Table for a table, from Photographic Lenses, by Beck and Andrews, giving the length of studio required for the use of lenses of different focal length. In this table a space of from six to eight feet is allowed for the camera, operator, etc. Should the photographer from his experience know that this is insufficient, more should be added to the suggested studio lengths.

Focus of Lens	Size	Kind of Portrait	Length of Studio	Distance of lens from object
Inches			In feet	In feet
6	Carte - de-Visite 31/4	Full length	18 to 20	11 to 12
7 1/2	Carte-de-Visite	Full length	22 to 25	14 to 15
81/2	Carte-de-Visite	{ Full length Bust	24 to 28 10 to 15	17 to 19
91/2	Cabinet and smaller groups	{ Full length Bust	20 to 23 12 to 17	12 to 13
11	Cabinet and 5 x 7 groups		25 to 30 13 to 20	17 to 18
1472	Cabinets, Panels and 6½ x 8½ groups	{ Full length Bust	32 to 40 14 to 20	23 to 24
19	10 x 12 Portraits or		20 to 25	13
2.4	16 x 20 Portraits or groups	∫ Full length	25 to 30	7 14 8

At the same time, it must not be forgotten that very good portrait work has been turned out of studios widely differing in proportion to the dimensions I have given. I have known a studio only fourteen feet long by nine feet wide in which thoroughly good work was made, but I would not counsel any one to build such a

studio. As to the height of the studio, this may vary according to the studio, giving good proportions. Where a double-slant light is put in, a height of ten feet is ample for the north or glazed size, with a normal slope for the skylight. Where a single-slant light is employed, a height of fourteen or sixteen feet from the floor to the top of the side-light may be desirable.

The general dimensions of the studio Size of and direction of the light having been Skylight determined, the size (or area) of the skylight itself requires consideration. This is in a measure determined by the size of the studio, although there is often no definite relation between the two. Taking the average studio as being a room twenty-five or thirty feet long by eighteen feet wide, to be fitted with a double-slant light, the side- and skylights are usually about ten feet wide, the side-light commencing within three feet from the floor and extending seven or eight feet in height, thence continuing in the skylight at a slant of about forty-five degrees, the top-light being ten feet by twelve. Such a light and the way it is set in the building is seen in Fig. 11.

For the studio where we have ample width, say, twenty-five or thirty feet, the single-slant light may be used with advantage. This form is shown in Figs. 14 and 15. The side-light here is indented within a slant of 60 degrees, but the single-slant light, as a rule, is inclined at an angle of 45 or 55 degrees. A typical example is seen in the Inglis light, Fig. 16. Apparently this light is set in two or three feet from the perpendicular, where it joins the roof. The difficulties which come in working with a single-slant light arise from attempting to place the subject too near the light, which gives harsh contrasts in the illumination. Greater softness and diffusion, with more modeling, can be obtained by working with the subject at least eight or ten feet away from the light. This is why extra width is required in a single-slant light studio.

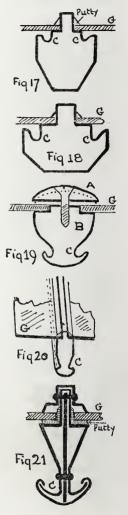
With regard to the area of the light, it is possible to work with a very small light area. As a matter of fact, among studios where a large light is provided, much of the light area is cut off or obscured by blinds or shades most of the time. The recent fashion for concentrated lighting went to such extremes that many photographers became expert in the use of a light space equivalent to that furnished by the single window of an ordinary room. But, while the photographer may now and again make good use of a concentrated lighting, he must necessarily be prepared for wider possibilities, such as a group of bridesmaids, or, still worse, a large group of men in dark clothing, as, for instance, the local staff of police officers and the like. For this reason it is well to provide beforehand a generous amount of light area, which may be modified and varied according to the requirements of the moment.

Angle of Light

The question of the angle formed by the side-light or by the side- and skylights together is not unimportant. An old idea, not yet extinct, is that the slope of the glass acts, so to speak, as a prism, and according to its angle throws light into one or another portion of the studio or at such and such an angle upon the subject. The point of real importance in this is that the most favorable light for desirable modeling and the ordinary illumination in a portrait is that which reaches the subject at an angle of 45 degrees from above at the side and usually slightly in front of the subject, regardless of the inclination or angle of the skylight frame.

When the general lines and form of Sash-bars the skylight have been determined, the or Rafters detail of rafters or sash-bars needs men-These may be of wood or metal, according to choice, but obviously metal offers greater rigidity, with less obstruction to the light. Skylight rafters in metal can be obtained commercially, Fig. 21 showing a Hayes design. In this the glass is imbedded in putty simply to form a solid bed for the sheet of glass, which is protected by a metallic cap extending from the rafter and covering half an inch of the glass G. double trough at C serves to collect and carry away the product of condensation, which would otherwise drip into the studio. Fig. 20 is a common form of wood rafter hollowed at each side to carry away condensation or leakage at C. Fig. 10 is an ingenious attempt to secure a water-tight joint by fixing to the top ridge of the rafter a flat, half-rounded beading, as shown in the diagram. The lower half of the rafter is designed to take care of condensation, as in the other forms. Figs. 17 and 18 are sections of rafters recommended by a committee of photographers appointed in 1871 to advise upon the construction of a model skylight for the studio.

The glass used Glass for glazing the skylight is not so vital a factor as it was in earlier days, when speed was the one thing most desired, and the use of blue glass was patented as giving a more actinic light. The choice today lies between clear or fluted (ribbed) and ground glass. Where an abundance of light is available, ground glass is altogether preferable, as giving a softer and more diffused illumination. Ribbed glass, is much better for studio purposes than plain glass in that it gives diffused illumination. The sheets of ribbed glass are placed so that the ribs run up and down, not across from side to side. Bolas, in his Photographic Studio, recommends the colorless St. Gobain rolled glass, one-fourth of an inch thick and having twelve flutes to the inch. Haves recommends rough plate threesixteenths of an inch thick (for a sheet 15 x 40 inches), in pref-





By Gertrude Käsebier



erence to fluted glass, as admitting more light and

accumulating less dirt.

Where, for any cause, the south or west side of a room is glazed for studio purposes, the light should be made of ribbed glass, and an inner frame should be arranged, about three feet in width, which should be glazed with ground glass. By arranging this inner frame so that it will run the entire length of the sidelight, it can be fixed at any desired point to subdue direct sunlight entering the studio. Some years ago I worked in a studio with a southern aspect, in which such a ground-glass screen was in constant use during the afternoons. By its use the most delicate draperies could be photographed without difficulty, and it entirely obviated the troubles usually resulting from the glare of direct sunlight in the studio.

The use of ground glass has largely increased of late years, and it is not uncommon to find studios having

the skylight completely glazed in this way.

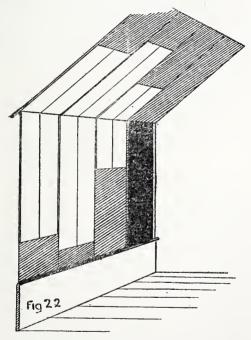
Before glazing the side- and skylights, make sure that the framework is suffi-Glazing ciently strong and rigid to hold the glass firmly against strong wind. If the framework is too slender or poorly constructed, a sudden storm of wind may destroy the light. Such a catastrophe, however, is not the real danger. Unless the frame is sufficiently rigid to hold the glass against pressure, it will "give" or yield sufficiently to loosen the putty holding the sheets in place (especially commercial putty), and so make way for rain and leakage. Make sure, therefore, that the framework is sufficiently strong, and, unless constructed of metal, that the wood used is thoroughly seasoned. Before closing the light, whether metal or wood, prime it well with two coats of good oil paint, choosing a time for this work when the sashes are quite dry, preferably in the afternoon of a hot day. See that a special lot of putty is made up for the work. common putty, which first dries and then crumbles away, is worse than useless.

Bolas gives a good formula for putty which the photographer may prepare for himself: Two parts of whiting and one part of white lead, or, better still, finely ground

litharge, are dried and mixed with the necessary quantity of boiled linseed oil. The mixing is done by continually turning over the materials on an iron or wooden slab, and between each turnover knocking the paste down to a thin sheet with a heavy broad-faced hammer The secret of mixing good putty is plenty or mallet. The putty is evenly spread in the rivets of the sash boards about an eighth of an inch in depth and the glass is carefully laid in. In glazing with ground glass the ground side of the sheet is invariably put in the in-Do not make the mistake of having any sheet of glass tightly fitted in the rebate. There may be a slight swelling or shrinking in the framework, and the glass which is fitted too tightly will sooner or later develop little curved cracks at the corners. The sheets should be cut so that they fit easily within the rebates of the

rafters.

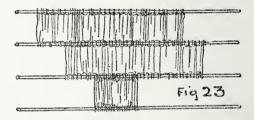
The side-light may have transverse sashes, each sheet of glass being framed on four sides with wood. In the roof-slope or skylight proper, there should be no horizontal bars, only those running from eaves to the ridge. Each sheet of glass should overlap the one below it, from two to three inches, and there should be no putty or other interference at this joining. If the sheets of glass thus laid over each other are in contact where they overlap, water will soak up between them by capillary attraction, and not only cause a leak in the studio, but, what is worse, will leave a fine but very unsightly film of dirt between the portions overlapping. This is very simply prevented by leaving not quite one-twelfth of an inch between the surfaces of the glass. A couple of narrow strips of tin or lead, say, two inches long and a quarter of an inch broad, bent over the end of the lower sash, will prevent sheet number one from settling right down upon it. While rain will persistently percolate through a closed contact joint, an opening through which a drop can travel is, properly gaged, a safe preventive of leaking, and there is little fear of any rain being forced up this space between the two sheets of glass, even in a storm strongly driven from the north. Remember that putty alone is not sufficient hold for the sheets of glass. When the glass is firmly bedded down into its bed of putty, it should be held in position with two or three one-inch brads on each side, driven diagonally into the sash, if this is of wood, or closed with a cap if of metal. These brads, which, of course, will project slightly, are covered by the external layer of putty. Having in this way glazed the whole of the light-area, the outer rebates of the sashes are well puttied and smoothed, just as is done in glazing an ordinary window.



Curtains or Blinds

Some means of controlling the light is as necessary as the light itself. In planning to control the illumination of a studio it is well to remember that here, as in many other things, the simplest plan is usually the most

practical. If the skylight, whether double- or single-slant, has been made large enough for any emergency, it will usually need considerable reduction in area for special classes of work, and even for the ordinary purposes of portraiture. This control in the modern studio is usually accomplished by providing two sets of blinds running on spring rollers from top and bottom of the light. The first set of blinds, placed close to the light itself, are of opaque material which may be dark brown or dark blue according to individual taste. The second set of blinds, usually placed three or four inches away from the light, are usually of white Holland or tracing linen. Each set of blinds is



composed of four or five widths of material mounted on separate rollers and separately controlled by cords hung upon pulleys placed at the top and bottom of each upright sash. The purpose of this is to provide a means by which any portion of the light may be controlled at will. The arrangement of these opaque and translucent blinds is indicated in Figs. 6, 16 and 22. As a general rule, the blinds are not so wide as those shown in Fig. 16, most photographers preferring to have each blind cover only two panes of glass, as shown in Fig. 22. The opaque blinds are, of course, used only when a portion of the light is to be entirely obscured or cut off. The translucent blinds are continually changed to modify the lighting according to the effect desired.

For screening a large top-light, the old arrangement of draped muslin or cheese-cloth curtains sliding easily

on wires stretched from end to end of the light has not yet been surpassed for convenience and efficiency. The arrangement of these and their position under the light is sufficiently indicated in Figs. 23 and 24. The curtains on each pair of wires should overlap the next set, and be divided at the center so that they can readily be removed to either end of the light as desired. It is well to extend the wires two feet beyond the extreme length of the light, so that the curtains can be pushed clear of the light when this is desirable.

A similar set of curtains, which may be of creamtinted, yellow or pink muslin, set upon a movable

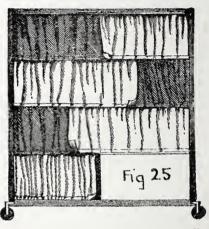
frame as shown in Fig. 25, is sometimes employed as an additional screen between the subject and the side-light. Where, for any External reason, the pho-Shades tographer finds difficulty in excluding the sunlight from the studio. as in cases where top-light is very slightly inclined after the style of an old wet-plate light, some system of external

necessary. Sometimes this can be accomplished by erecting—for summer months only—a temporary vertical screen of canvas from the ridge of the skylight. An early device affording a permanent screen of this kind, constructed of wood, is seen in Fig.

shades or screens will be

26, while a more elaborate arrangement of movable shades is that shown in Fig. 27, this being the system advised by the Philadelphia committee of 1871, already mentioned. Here we have four sets of five shades to each set, each shade measuring thirty inches long and of such a width that when closed each set completely covers a strip of the full width of the

skylight. As shown in the diagram, each shade is pivoted at the center of each end to an iron frame, each set of five shades being controlled by means of a cord, accessible inside the studio. This system is much more elaborate than anything of the kind now



used, as far as my knowledge of existing studios goes, but it is effective for its purpose and keeps the studio cool even when exposed to considerable sun.

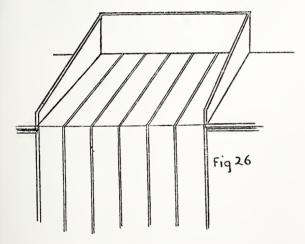
The difficulty of providing for the ventilation of the studio by movable sashes in the skylight, affording possibilities of leakage, etc., has led to the adoption of ventilating systems operated separate and apart from the skylight. Thus a window inserted at the end of the studio is a simple and effective means of providing ventilation, or a set of small screened ventilators may be placed under the side-light and at the ridge of the top-light in the roof. This, however, is a simple problem, which need not be specially provided for here.

Having now discussed the details of studio construction as applicable to the professional skylight, we can turn our attention to the needs of the amateur, in providing for whom we necessarily include the professionals located in small towns, whose studios are often built as additions to the home.

An Amateur's Studio

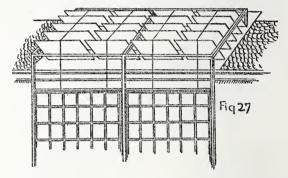
The construction of a studio for amateur portraiture is a much simpler problem than the professional studio.

I have known amateurs who, by extensive structural alterations, have adapted the top floors of their homes for studio purposes; these were exceptional cases, where nothing less than professional facilities would satisfy the ambition of the photographer. Generally speaking, the amateur builds his studio on vacant ground adjacent to his home, and in many instances personally plans and shares in its actual construction.



This method offers comparatively little difficulty in America, where the average country home is surrounded with ample space, lumber is cheap and abundant, and building by-laws are liberally administered. In the older countries of Europe such things are not so easily controllable, and borough surveyors or local boards have to be consulted as to plans and proposals.

For an inexpensive but thoroughly practical studio, the plans and specifications given by Mr. I. H. Nelson, in the *Photo Beacon* for January, 1900, are well worth our attention. In reprinting them, with acknowledgment to all concerned, I would point out that metal skylight frames, ready for bolting together and glazing, can be obtained commercially, by which means the reader can avoid the difficulties involved in the construction of the skylight portion of the studio. It is



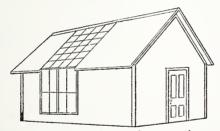
probable, also, that the cost of some of the items mentioned could be reduced in other localities (e. g., in Great Britain). The table of costs given is based on prices current at Racine, Wisconsin. I quote Mr. Nelson:

In writing this article I am assuming that the amateur photographer intends to turn amateur carpenter and build the studio himself; I have therefore gone more fully into the details of the framing than would be necessary were a regular carpenter to be employed. The first thing to decide on is the size of the building. This will depend on several things—the space one has, the kind and amount of work he expects to do in it, and the amount of money he is willing to spend.

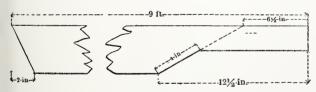
These plans call for a building 21 feet long, 14 feet wide, with 9-foot walls, which I consider a good allround size.



End elevation - 1/4 inch equals 1 foot.



View in perspective-not drawn to scale.



Plan of rafter - 1/2 full size.

The following bill of lumber will be needed:

2 sills, 6 x 6 inches, 21 feet long 2 " 6 x 6 14 15 floor joists, 2 x 6 inches, 14 feet long 16 studding, 2 x 4 9 " 12 2 X 4 2 x 4 2 plates. 2 I " 16 rafters, 2 X 4. Q " " 3 braces. 2 X 4 14 600 feet drop siding

400 feet common boards for roof

400 feet matched flooring

80 lineal feet 8-inch casing for cornices

220 lineal feet 4-inch casing for cornice and skylight frame

2 8-inch sound cedar posts

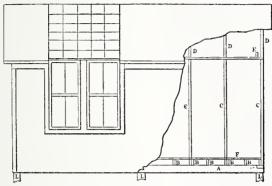
The posts usually come 7 or 8 feet long; they should be cut in two and firmly bedded in the ground, with the top about one foot above the surface.

Place one post where each corner is to be and one in the middle of each side. It is understood, of course, that the side in which the skylight is placed should be to the north.

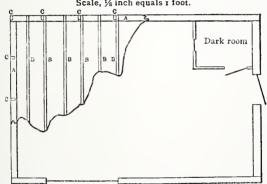
The sills, after being mortised as shown in the plan, are placed in position on the posts, and, after being

leveled, securely spiked in place.

Mark off the two long sills in 18-inch spaces and place the floor joist in position on these lines; some of the roof boards may be laid down for a temporary Next take the two plates and mark them off in 3-foot spaces; lay one of them on edge on the temporary floor with the marked side facing and about 91/2 feet from the edge, and place one of the 9-foot studding at each mark, the other end being over the sill, where they will stand when raised. Drive two spikes through the plate into the end of each studding, when the whole frame can be raised to position, the studding resting on the sill beside each alternate floor joist, where they should be strongly spiked both to the sill and joist. A temporary brace, from the top at each end to the middle of the end sill, will hold it steady. The other side is raised in the same way. The cross braces are next put



Side elevation, broken part showing construction of frame. Scale, 1/8 inch equals 1 foot.



Floor plan, broken part showing details of floor framing. Scale, 1/4 inch equals 1 foot.



into position across the top, one in the middle and one 4 inches from each end. The rafters are cut according to the diagram and put up a pair at a time, omitting the one where the skylight comes; the one opposite the skylight being fastened to a ridge-piece 2 x 4 inches, 6

feet long, set in between the ones at each side.

The end studding can now be put in place, four on each end, running up to the rafters. This completes the frame. The siding and roof boards are now put on: the roof boards should extend 8 inches over each end to form a cornice similar to that at the sides. cornice is cased in with the 8-inch and 4-inch boards, and 4-inch boards put at the corners.

The four sides of the skylight opening should be cased in with 1-inch boards, 4 inches wide (H1), allowing them to extend 1 1/2 inches above the roof. frames or rafters (H2) which carry the glass are nailed to the casing at each end, with their top edges flush

with the top of the casing.

The roof-covering is now put on. I would recommend the amateur to use a good roofing (prepared water-proof) paper for this purpose; it costs less and can be put on in one-fourth of the time required to shingle the roof. Use plenty of nails in fastening it down—three inches apart is none too close. ting it around the skylight, allow the paper to extend to the top of the casing and nail a batten (O) 1 1/4 by 1/2 inch over it. A batten I by 1/2 inch (M) is nailed on top of this all around, making it water-tight and, at the same time, forming a rebate ½-inch for the glass to set Small battens (I), ½ by ¼ inch are nailed edgewise on top of the four frames, making 3/8-inch rebate on each side. This will leave spaces 14 inches wide between the sash frames for the glass.

The skylight frame should have two coats of good white-lead paint before the glass is put in. In glazing, begin at the bottom of each sash and lap each succeeding sheet of glass at least 1 ½ inches over the one below it, after the way of laying shingles.* For the side-light

^{*}Mr. Nelson forgets to caution the reader regarding commercial putty, which is generally a delusion and a snare for the unwary. The studio builder will do well to get a special lot of putty mixed to order, or, better still, mix his own putty. Bolas gives a method for making putty which we quote on p. 77, and would call special attention to it.—EDITOR.

two ordinary windows (such as can be had ready-made at the lumber-yard or mill) will be more convenient than the ordinary side-light construction, as they can be opened at will for ventilating purposes.

The dark-room can now be built according to any individual plan desired. There should be enough of the

flooring-boards left over for this purpose,

If the builder does not mind the slight extra expense (about \$25), I would advise him to line the studio with matched (or grooved) boards. This is not essential, but it adds to the appearance of the interior. If this is not done, all the framing and inside of the roof and side boards should be "dressed"—which can be seen to when buying lumber at the mill. As soon as possible, after the completion of the building, the outside should receive two or three coats of paint.

No provision for a chimney has been made in these plans, although a small one made of tiles, set in the ridge at one end, might be found desirable if the studio is in constant use. An oil-stove will probably prove

more convenient for occasional use.

As to the cost of this studio, the table following is made up from the actual prices of material in this town (Racine):

(Racine):
1,200 feet of framing and roof boards at \$16
per M \$19 20
1,000 feet of drop siding and flooring at \$20
per M 20 00
130 feet of casing at \$25 per M 3 25
3 cedar posts at 25 cents each
400 feet of roofing paper at 1 1/4 cts. per foot. 5 00
I door and 2 windows 3 00
Hardware (nails, etc.) 3 00
30 lights of glass 14 x 18 inches at 15 cts.
each 4 50
3 gallons of mixed paint at \$1.25 per gallon 3 75
[[
[£12/17/1] \$62 45
A More Where ways and means permit of a
Attractive more elaborate scheme, the studio for an
amateur suggested by Mr Herbert Wil-

Attractive Suggestion amateur suggested by Mr. Herbert Wilson in Camera Craft, May, 1903, offers a charming alternative. Mr. Wilson, with experience

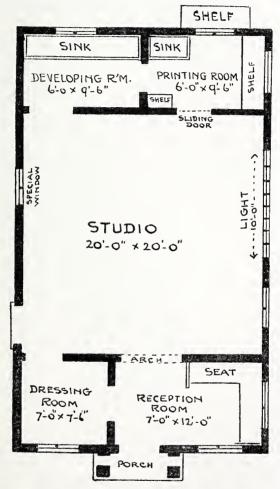
in things architectural, clothes his ideas in attractive sketches of which my crude reproductions give only a faint notion. But the exterior is a wash drawing and I have made a slight change in the ground-floor plan, so

that reproduction was necessary.

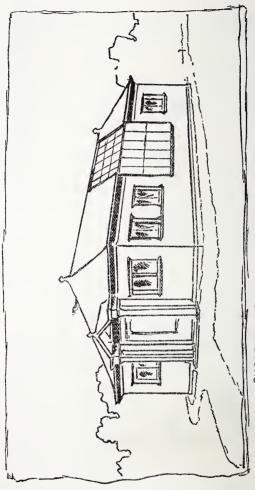
The designer of this studio is satisfied with the exterior scheme, but offers the ground-floor plan simply as a suggestion to draw forth hints for its improvement. To my mind, the plan does not permit of much improvement. I have extended the width of the side-light perhaps a couple of feet and have brought it a little nearer the center of the north side of the studio. This gives me rather more space behind the subject, which is desirable, and the additional illumination given by extending the light area seems to be essential in a room measuring 20 feet by 20 feet. Then I have put a sliding door at the end, leading into the printing-room, not necessarily for use as an entrance to the room, but chiefly so that I can work from both ends of the studio. By means of this opening the camera can be placed just within the printing-room, giving the desirable distance between camera and subject when the latter is placed at the reception-room end of the studio. Apart from this, it is often desirable to leave or enter the printing room when the developing-room is in use and, therefore, closed. Finally, I have inserted the "Special Window" in the south wall of the studio, not provided by the designer. With this window, usually darkened or screened, I can obtain special effects of lighting resulting from the use of sunlight concentrated by means of a relatively small light area or window. arched opening between studio and reception room should be fitted with a sliding door so that it could be closed at will to secure privacy during a sitting.

These are minor details and merely explain the changes made in Mr. Wilson's original drawing. As it stands, I consider the arrangement and design of the studio building altogether pleasing and well calculated to give satisfaction and comfort to the photographer and his subjects. From the dimensions given, the reader will doubtless be able to construct such a studio

for his own use, if desired.



GROUND PLAN OF AN AMATEUR'S STUDIO From a sketch by Herbert Wilson in "Camera Craft"



SUGGESTION FOR AN AMATEUR'S STUDIO From a sketch by Herbert Wilson in Camera Chaff"

Here we must perforce make an end of our excursion, with cordial acknowledgment to all those whose hints and helps I have "lifted" for our information, and special acknowledgment of the help of Mr. William Edward Ward, to whom I am indebted for a large part or the data forming the basis of this monograph.

BOOKS

The Photographic Studio. A Guide to Its Construction, Design and Selection of a Locality. By Thomas Bolas. 94 pages; illustrated. 1895. (English). \$1.

The Studio and What to Do in It. By H. P. Robinson. A Handbook of Information on the Designing and Building of Studios, with chapters on Posing and Lighting. 148 pages; illustrated. 1898. (English.) \$1.25.

Wilson's Quarter Century in Photography. By Edward L. Wilson. Contains chapters on Studio Construction and Equipment, with many plans and diagrams. 502 pages; illustrated. 1886. \$4.

Potes

The International Photographic Exposition at St. Petersburg, opened a few weeks ago, will rank as one of the most important events of its class organized in recent years. It comprised no less than sixty sections, the display of pictorial photography being especially interesting. France, America, England, Italy, Belgium and Germany sent notable exhibits to the pictorial section, which also included the contributions of many Russian photographic societies. The industrial professional and photomechanical sections were well supported, although American workers did not contribute in these classes. The government office at St. Petersburg exhibited a special collection of prints showing the uses of photography in government departments. The exhibition seems to have attracted considerable attention and was Il attended.

A

The Photographic Society of Hamburg, Schwanenwik 33, Hamburg, announces the publication of a portfolio with twenty-five photogravures illustrating the various "schools" of photographic work in Germany. The subscription price has been fixed at \$10.

4

The balance sheet of the Eastman Kodak Company as at December 31st last, shows the result of the first half-year's business of the various interests amalgamated last year. The company is a consolidation of the following: Eastman Kodak Company, of New York; American Aristotype Company, of Jamestown; M. A. Seed Dry Plate Company, of St. Louis; Canadian Kodak Company, Ltd., of Toronto; Kodak, Ltd., of London; Eastman Kodak S.a.f., of Paris; and Kodak

NOTES 95

Gesellschaft m.b.H., of Berlin. The net profits of these various companies appear at \$1,488,295 (£306,865). This amount is sufficient, after providing for depreciation and after paying 6 per cent per annum upon the preference shares, to pay about fourteen per cent per annum upon the common stock. The company has very large unemployed resources, the cash on hand and other liquid assets amounting to the large sum of \$5,610,000 (£1,122,000). When the bulk of this idle capital is fully employed the profits of the company should be very materially increased. It is stated in the report that such new capital as was invested in the purchase of other businesses during the period covered by the accounts netted at the rate of 6 per cent on the amount paid for tangible assets, and 22.60 per cent on the amount paid for goodwill.

4

"How and Why Photographically" is the title of a booklet for amateurs issued by the Charles W. Whittlesey Company, New Haven, Conn. In its arrangement and the quality of its information this booklet is a decided advance on many first handbooks for beginners, the instructions being based upon experience in the branches usually attempted by the beginner with his first camera. It is illustrated, has marginal headings to the different sections printed in red, and is of convenient size for the pocket.

#

The Lewis Camera and Supply House, 128 West 23d street, New York, sends to our table a very convenient little price-list of cameras and supplies for the amateur, with special prices. This firm began very modestly a few years ago and, by its policy of selling goods at a small margin of profit, has grown rapidly in popularity. A special feature is made of mail-order business.

-,74

From the Rochester Optical and Camera Company, Rochester, N. Y., we have received a price-list of the Homocentric Lenses made by Ross Ltd., London, for which the R. O. C. Company are sole agents in America. In this catalogue the Homocentric is clearly and fully described, with its peculiar advantages for different classes of work. As a guide to the intelligent choice of a lens, this price-list offers much interesting information applicable to all modern anastigmats. Copies can be obtained from the R. O. C. Company on request.

4

The new catalogue of photographic apparatus and supplies just received from Burke & James, Chicago and New York, forms one of the most complete photographic lists thus far issued. Those who would appreciate an illustrated survey of the very latest apparatus and appliances used in photography, should send to Burke & James for a copy of this list. It is profusely illustrated and unusually full of information. Messrs. Burke & James are fortunate in having a remarkably complete assortment of apparatus and specialties of their own manufacture. This stock is being continually added to and the new catalogue brings the list up to date. A four-page index affords easy reference to the thousand odd specialties included in the catalogue.



We have received from the Lamson Studio, Portland, Maine, a collection of colored platinotypes, embracing views in the island of Jamaica, landscapes, shipping and seascapes, which impress us as much more satisfactory and pleasing than the average in colored prints. Mr. J. Harry Lamson, who is, we believe, responsible for these views, is an unusually skilful worker, and the prints are very attractive souvenirs of the scenes they represent. For wall decoration, portfolios and gift purposes the Lamson Prints should have a wide and increasing popularity. According to the list accompanying the prints, they are obtainable at very reasonable prices.

PHOTOGRAPHIC LENSES A Simple Treatise by Conrad Beck and Herbert Andrews

288 pages, $5 \times 7 \frac{1}{2}$, profusely illustrated with halftones showing comparative results obtained with different lenses and many diagrams in the text, marginal index, etc. Two editions: Red cloth, 75 cents; and de Luxe (a few copies only) in superior binding, with photogravures, etc., \$1.00

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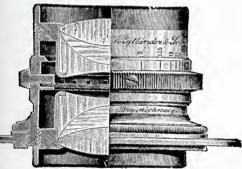
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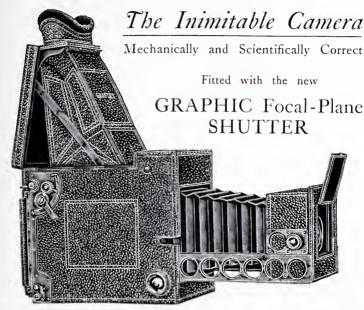
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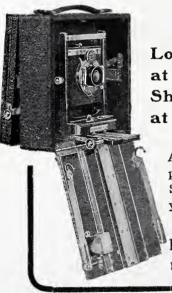
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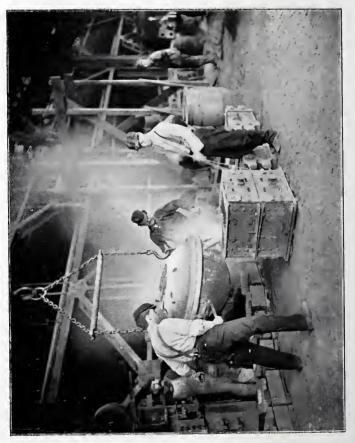
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DARK-ROOM DODGES

lust as surely as necessity is the mother of invention and inconvenience the progenitor of expediency, so, sooner or later, do we all - who pursue elusive sunbeams and fantastic shadows under the ruby lamp become prolific inventors or artful dodgers. not be otherwise; photography confronts us with so many necessities to be provided for - or dodged! No matter how simply the novice begins, or how forethoughtful the expert be, they meet at last in the inevitable resort, dodging and contriving in ways innumerable to make means fit their ends. Probably this is true of all craftsmen, but certainly in photography the individual worker speedily becomes a law unto himself, devising expedients and modifying methods to suit his own peculiar needs. And every man's necessities are slightly different from those of his neighbor! Out of these spontaneous and temporary expedients come, now and again, the happy dodges which enable us to make sport of necessity. Then one day a friend comes along, who, seeing the dodge in practical operation, exclaims: "Splendid idea! Just the thing for its purpose. Why do you not patent it - or publish it?" A thousand dodges of this sort are recalled as I write: McCorkle's needle-hole shutter, Nicholson's lens shade, Kodak film clips, Moore's push-pins, the plate handle, the pointed thimble serving as a plate lifter, the corrugated finger-tip which grips, the plug of cotton-wool pulled halfway into a bit of glass tubing to form "Buckle's brush," and a host of similar trifles which, like a drop

of oil, make the wheels go round more easily and without friction.

Here we have the purpose of this little book: to gather together for ready reference a few dodges for the dark-room worker; home-made contrivances or "tips" which may serve in an emergency to take the place of more elaborate conveniences. For the most part a few pence, a little leisure and such handy tools as may be found in the home will suffice for their making. And, this is worth noting, they are all practical dodges, being largely contrived by an artful dodger for his own use; or "lifted" from the notebooks of other worthy dodgers; or seen in the rose-red light of other dark-rooms. It is needless to add that all dodges should be taken as they are given, in the indicative rather than in the imperative mood.

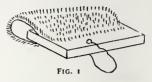
That the dark-room should be kept Dust and free from dust is a precept which needs Ventilation no emphasis here. In wet-plate days, this presented no difficulty; everything about the darkroom was so "wet" that dust had no chance to work evil. But in these days of dry-plates and film the problem of keeping dust out of the dark-room and, at the same time, securing abundant ventilation, has brought forth many inventions. The plan I adopted in my basement dark-room years ago has proved as efficient as it was simple. Procuring, from a neighboring plumber, twelve pieces of 11/2-inch lead piping, each piece seven inches in length, I bent these to form a right-angled tube similar to B in Fig. 4, except that the bend was about two inches from one end. These tubes I lined with coarse felt or flannel, LePage's glue serving as the adhesive. Next, this felt lining was saturated with linseed oil. Six of these tubes were snugly fitted into holes bored through the dark-room door, about five inches from the floor, the long arm of each tube hanging free within an inch or so of the floor inside the room. On the outside of the door I fixed a strip of wire-net, to cover the circular apertures, admitting air from the passageway. The other six tubes were similarly fixed into a wood panel above the darkroom window, thus communicating with the free air out-of-doors. In this case, however, the long arm of each tube was turned to the ceiling. By this simple dodge, which occupied a spare afternoon, I secured abundant ventilation, freedom from that musty dampness peculiar to basement dark-rooms, and a minimum of dust, the air passing through tubes lined with oiled felt. The tubes should be removed three or four times yearly, and the felt re-oiled; but beyond this slight trouble the system has given perfect satisfaction.

This is an elementary detail, but is Dusting the often an unsuspected source of trouble. Dark-room I have often wondered to see otherwise intelligent workers dust down their shelves and tables. and then begin to change their plates or develop a batch of exposures. This is beginning at the wrong end. Dusting the dark-room should be done at night just before closing, or at least a few hours before any photographic work is attempted. When any dark-room work is on hand, take time by the forelock. Early in the morning take a slightly damp cloth or mop and gather up the dust from shelves, table and floor. low this with a dry cloth, and then let the room be closed for an hour or two at least. With this simple precaution, the reader may at all times be confident that dust will not trouble him in the operations of changing or developing his plates.

It has been my practice for a long Dusting the time to do this while the plate is in the Plate holder. This I do by drawing out the slide and then slowly and lightly passing a dry, broad and soft camel's-hair brush over the film. In the wooden handle of the brush is a hole, and through this a loop of elastic. This loop conveniently goes over the top button of my coat, so that I do not need to put down the brush on a dirty table or wet shelf during the operation. The loop also serves to hang up the brush on a nail at the end of a shelf opposite the darkroom lamp, so that it can readily be seen in a dim light. For large plates I prefer a home-made brush, as shown in Fig. 1. This consists of an old film bent over to bring edge to edge, covered with silk velvet. the two ends being fixed to a bit of cigar-box for a

handle. One point to remember when dusting plates is that if you quickly rub the film with the duster you charge the surface with electricity, and this tends to

attract particles of dust. This point can be demonstrated by briskly rubbing a bit of clean glass with a bit of silk and then holding it half an inch away from some tiny particles of paper.



[A better dodge than this is to dispense with brushes altogether and keep plate-holders, storage boxes, etc., clean. In twenty years' practice I have never used a brush or dusted a plate, in spite of which pinholes or dust marks very rarely appear in my negatives. This I learned in professional days when the plates used ranged in size from 5 x 8 to 28 x 32 inches.—EDITOR.]

Plate-holders, dark slides, or whatever you please to call them, require cleaning Lubricants out occasionally. This is best done in for Holders daylight. At the same time see that the slides draw in and out easily. If not, ease them with a little dry black lead or soft graphite. A fairly soft pencil is convenient for this purpose, and enables one to get into On no account use oil, the corners and grooves. grease, or anything of that kind. Some writers have suggested French chalk (i. e., talc), but experience is against its use. It tends to rub up into fine powder, which finds its way onto the film. This dodge applies also to the sliding parts of the tripod legs. For the sliding parts of a camera (metal on metal) a touch of watchmakers' oil may be used, but a practical camera maker of many years' experience says the best thing is a very slight touch of Russian tallow. This I am now trying, and so far I find it quite satisfactory, except for the smell, which is not all that one could wish. I cannot see why an ordinary tallow candle is not equally desirable. Do not use any metal polishing pastes. They soon make sliding parts clog. For parts of metal which screw into each other, a touch of good vaseline is advisable.

This is an item of considerable im-A Darkportance, and a few words about the Room Lamp form which I have worked up to may be There are innumerable patterns buyable suggestive. at all prices, yet I found it cheapest to have made for me the one I have now had in satisfactory use for some vears. It consists of a tin box roughly 12 inches high, 12 inches wide, and 6 inches from back to front. parts are fixed together by over-lapping joints, strengthened by rivets in case of the solder giving way. Light is trapped in the usual way. The front contains two grooves, the outer one wide enough to easily hold three sheets of ordinary glass loosely. The inner groove is



about half this width. A glance at Fig. 2 (not drawn to scale) will show how these two grooves may be used to hold sheets of colored glass. I find a gas flame the most convenient light, inside the box which is fixed to the wall to my left, over the sink. Inside the box and behind the flame is a sheet of white pot or flashed opal glass. This acts as a reflector; and a sponge and soap will clean it in

Next comes a sheet of fine ground glass (dotted in the diagram) in the inner groove; and in the outer groove one or more sheets of colored glass, according to my needs. For bromide paper and lantern plates I find a sheet of orange glass quite safe with ordinary care. For ordinary plates I replace this by a sheet of ruby glass. For more sensitive plates the orange and ruby glass are used together, or any other combination of "safe lights" required for the manipulation of the particular plates in use.

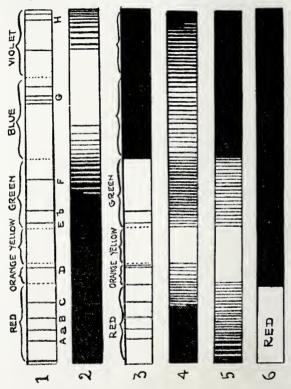
For orthochromatic plates I use a triple screen of aurantia, naphthol yel-A Safe Light low and methyl violet 6B. The easiest plan to prepare these is to fix and wash three unexposed ordinary plates, so as to obtain glasses coated with clear gelatine, and then soak them in aqueous solutions of these dyes, as described in THE PHOTO-MINIATURE No. 6. It is not every amateur, however, who finds it convenient to buy a box of 12 x 15 plates in order to get three sheets of glass a foot square coated with gelatine. I tried this plan, but found the gelatine coating so thin that it did not hold a sufficient quantity of dye. My next plan was to obtain three pieces of ordinary clear glass 12 x 12 inches. These were thoroughly cleaned. A flat drawing board was carefully leveled with the aid of three wedges underneath. A glass ball about the size of a hen's egg (costing a few cents at the toy shop) soon helps one to get the board level, as it always rolls toward the lower side of the board. I now take 15 to 20 grains of shredded gelatine (Nelson's) and soak this in one ounce of a cold saturated aqueous solution of aurantia. When the gelatine is quite swelled, the containing vessel is put into a pan of warm water and the gelatinous mass gently heated. Meanwhile the glass plate to be coated is slightly warmed. Then the aurantiagelatine solution is poured on the warmed glass plate laid on a sheet of paper on the level drawing board. A glass rod enables us to guide the liquid. The plate being warmed keeps the mixture fluid for some little time, and so gives plenty of time to slowly add the coating and lead it to the edges of the plate. It is then allowed to set and dry in this horizontal position. In the same way we use gelatine and a cold saturated solution of naphthol yellow for our second plate. the third plate we do not need a saturated solution of methyl violet 6B, but one which is so strong that one drop seen by transmitted light on a glass plate is a fairly deep violet. In this way I found I got much more of the two yellow dyes. If the violet screen dries too dark it can be lightened by washing in cold water. If not dark enough it can be darkened after drving by pouring over its surface a stronger solution and allowing it to soak in. These three plates, when put together, permit only a narrow band in the far red end of the spectrum to pass. In this light the most sensitive orthochromatic plate may be developed. This set of dyes has been published before, but they are so very important and of such great value that their repetition here may be helpful.

Theory of Safe Lights

With the continual improvement of our sensitive materials and the tendency to make all plates and films more or less orthochromatic, i. e., sensitive to a wider range of color luminosities than the early unorthochromatic dry plate, it is more and more desirable to have a clear understanding of the problem of dark-room illumination. I therefore make room here for a graphic explanation of the theory of safe lights for the dark-room, given by Mr. Birt Acres in *Photography Annual*, 1901, which puts the matter in a nutshell.

In the accompanying diagram, strip No. 1 represents the spectrum, or band of colors comprising a ray of so-called "white light." In strip No. 2 we see the action of white light upon an ordinary unorthochromatic plate; the blue and violet rays actively impression the plate, while the green, orange and red rays are practically inert. By placing a piece of deep orange glass between the light and the prism giving the spectrum, the action of the blue and violet rays is minimized, as shown in strip No. 3, where the spectrum lacks the blue and violet bands absorbed by the yellow filter. If an ordinary unorthochromatic plate were exposed in this yellow light no action would take place unless the exposure were prolonged, because the yellow and red rays are only feebly actinic. Thus orange or yellow light is a safe light for dry plates of slow speed, wet collodion plates and bromide papers. Our modern plates, however, are sufficiently sensitive to green and yellow that such a light will fog them in manipulation, and these rays must be cut off to produce a safe light. Thus the action of yellow light upon a rapid or orthochromatic plate is apparent in strip No. 4, where it is seen that the yellow, green, blue and violet rays impression the

plate. This, also, explains why the combination of green and orange glass, sometimes advised as a substitute for ruby light in the dark-room, is unsafe. Strip No. 5 is supplementary and simply shows why a deep



orange screen is unsuitable for use in the exposure of orthochromatic plates, as it depresses the action of the blue and violet rays too forcibly and gives undue advantage to the green and yellow rays, thus accounting for the unnatural contrasts seen in negatives made with orange-colored ray-filters, with which we are all familiar. If a piece of pure red glass be substituted for the orange glass in the dark-room lantern, the action of all the rays will be depressed, with the exception of the red band at the extreme end of the spectrum. This is the only light which has little or no action upon even orthochromatic or extremely rapid plates, and, therefore, ruby or pure red light is the only safe light for use in manipulation of the plates and films of today. But not all red glass is safe, some samples permitting a certain amount of green and yellow light to pass, sufficient in many cases to fog a rapid orthochromatic plate in manipulation. How to test the dark-room light is told in the following paragraph.

Testing the dark-room light has also Testing the been touched upon in a previous num-Light ber of this series, The Dark-room, No. We would here supplement the remarks by a 33. further test, for there is ruby glass and ruby glass. The eye fails to tell us which is safe and which is unsafe. Moreover, plates vary in their sensitiveness. And, again, it may be safe to expose a certain plate to a light for, say, one minute and yet unsafe to expose it to the same light for ten To test this the "strip test" method is useful and easily made. Take a strip of card the same length as that of the plate to be used in testing. Cut this into a stepshaped piece like Fig. 3, having as many equal steps as you wish your test plate to register (in this case five steps). Put the plate into an ordinary plate-holder in the usual way, but do this well away from the dark-room lamp and under cover of the focusing cloth. Have a friend at hand to time the minutes with a watch. Now go up to the developing table. Draw out the shutter and expose the plate to the lamp FIG. 3 though developing it for one

minute. Then push in the shutter just the length of one step (marked 1). Expose for one more minute

and push in as far as the second step (marked also 1). Then expose for two minutes and push in again as far as the third step. Similarly give the four- and eightminute exposures, according to the times marked on the step. A moment's thought will show that the plate has had five different exposures, -of one, two, four, eight and sixteen minutes. Develop as usual, but keep the dish covered all the time; fix, wash and dry. Now lay the plate, film side down, on a sheet of white paper. You can then easily see the strip first to show a difference between the edge of the plate protected by the rebate of the plate-holder (hence the reason for changing the slide in the dark). Such a test will tell you, perhaps, that a two-minute exposure to the dark-room lamp just begins to show signs of light fog and that four minutes is serious. You will, therefore, conclude that during development your developing dish should be kept covered over most of the time, and that the total time of uncovering the plate for examination of the progress of development should not exceed the time your test plate indicates as the practical safe time limit. I lay some stress on this strip-testing method, both for plates and bromide papers and slides. Two points should be noted. If we are working with a rapid bromide paper, e. g., enlarging, the light may be just sufficiently unsafe to give a very slight fog which is not noticeable in the vellow light, and especially when the paper is wet, but is seen when the paper is dry. Similarly, when making slides a very slight fog veil may not be seen until the slide is examined against a white background.

Covers for Trays

Three kinds of tray-covers are useful, according to circumstances. First, thin pieces of wood about half an inch or an inch larger than the top of the dish. I have several of suitable sizes standing on edge by the sink side. These are cut from the ordinary backing boards used to back picture-frames. They are used simply to cover the dish as an extra precaution when developing. But if I want to turn up the naked gas flame to find a bottle or graduate during development, these flat wooden lids are not safe. In that case I use a stout cardboard lid, e.g., the lid of a half-plate box for a quarter-plate de-

veloping tray. This card-lid has a coat of black enamel paint inside and out, to make it proof against light and to protect it from the effects of splashing liquids. A third form of protection when the light is to be turned up for any length of time is needed. In that case I put the tray into a cardboard box with a lid.

It is a good plan to number every Numbering plate used. This may be easily done on Plates the dry film by the aid of a fine-pointed. rather hard pencil. If this number is written in the right-hand lower corner, as the plate is film facing you in the plate-holder, with the shutter drawn out to your right for dusting, it will always come in the foreground (not sky), whether the plate be exposed for a horizontal or vertical view. In that case the pencil number never shows when the plate is printed. Do not attempt to number a plate when the film is wet; a torn film is the probable result. This pencil number is not very readily seen, however, and if the plate gets much rubbing it may get rubbed out. Hence, as soon as the plate is developed and dried it should be re-numbered with waterproof ink, written with a fine-point steel pen. It can then be reduced, intensified, etc., without any harm. as the ink is not affected by most of the aqueous solutions we use for such purposes. If, however, we wish to remove the water-proof ink at any time, it can easily be done with a little methylated spirit, applied with a bit of clean rag. Higgins' water-proof India ink is excellent for this purpose. Where such an ink is not handy the dry negative can be numbered at the extreme edge with a sharp-pointed tool, which will cut the number clean through the film to the glass. Usually the negative has a rebate strip which offers place for this method of numbering.

Removing
Dust Dust on the film may arise from the
grinding of the sharp edge of the glass
plate against the wood of the plateholder. This is liable to arise when the
apparatus has been well shaken on a cycle or in a train.
In such cases the following dodge should be applied
before exposure, otherwise the negative will show dust
pin-holes after development. Hold the plate-holder by

one hand in a vertical position and give it two or three sharp raps on its lower edge upon the palm of the other hand. This will probably dislodge the fine particles adhering to the film surface and cause them to fall to the lower edge of the plate. Of course, this lower edge will be the long or short side, according as you are about to take a horizontal or vertical picture.

Air-bells are often caused by wetting the plate before pouring on the developer, consequently this should not be done. (For further notes on this topic, see THE PHOTO-

MINIATURE, No. 32: Defects in Negatives.)

Local Development

The warm end of a finger. Another useful dodge for this purpose is to warm a length of clay tobacco-pipe, the bowl being broken away, and then use this to direct a stream of warm breath upon the part. The developer is, of course, rocked over the warmed place at frequent intervals during this manipulation.

Retarding Locally

Locally

Local retardation may be attempted in the following way, but let it be said that this requires patience and care. As soon as the image is roughly suggested in position by the first flush of development action, the plate is washed under the spray and the surface dried by a sheet of pure blotting paper. A strong solution of potassium or ammonium bromide is locally applied with a soft brush and allowed to sink into the film for, say, two or three minutes. The plate is then quickly rinsed and returned to the normal developer in the dish.

The work-table used in the dark-room A Work-table is liable to become soiled and unsightly

by the constant action of chemical solutions. To avoid this, it is well to prepare the top of the table in such a way as to render it impervious to the action of acids and alkalies. A writer in the Journal of Applied Microscopy tells how to accomplish this, and I quote from his paper as follows:

Prepare the following solutions: 1. Iron sulphate, 4 parts; copper sulphate, 4 parts; potassium permanga-

nate, 8 parts; water, q. s., 100 parts. 2. Aniline, 12 parts; hydrochloric acid, 18 parts; water, q. s., 100 parts, or aniline hydrochlorate, 15 parts; water, q. s.,

100 parts.

By the use of a brush, two coats of solution No. 1 are applied while hot, the second coat as soon as the first is dry. After solution No. 1 has dried, the excess of solution which has dried upon the surface of the wood is thoroughly rubbed off before the application of solution No. 2. Then two coats of solution No. 2, and the wood allowed to dry thoroughly. The black color does not appear at once, but usually requires a few hours before becoming ebony black. Later a coat of raw linseed oil is to be applied, using a cloth instead of a brush, in order to get a thinner coat of the oil. The linseed oil may be diluted with turpentine without disadvantage, and after a few applications the surface will take on a dull, and not displeasing, polish. The tabletops are easily cleaned by washing with water or suds after a course of work is completed, and the application of another coat of oil puts them in excellent order for another course of work. Strong acids or alkalies when spilled, if soon wiped off, have scarcely a perceptible effect.

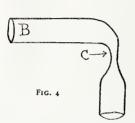
The writer used this method on some old laboratory tables which had been finished in the usual way, the wood having been filled, oiled and varnished. After scraping off the varnish down to the wood, the solutions were applied, and the result was very satisfactory.

These, roughly, are three. First, a short piece of rubber tubing which easily can be slipped over the nozzle of the tap. In the other end of the first piece of tubing is a short bit of stout glass tube. This is filled with bits of charcoal, and over its end three thicknesses of clean fine flannel are fixed. This is a handy filter for use when I want water free from any organic impurity or suspended matter, as in making or washing color screens. In a similar way, to my second bit of tube is fixed a rose or spray, which I had bought of a hardware dealer for ten cents. This is of brass, and in shape is but a small edition of the rose or sprinkling end of a

greenhouse watering-can. My third bit of tube is longer, long enough to reach from the tap to the bottom of the sink, or nearly so. Into the free end I can slip



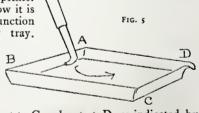
various shaped pieces of glass tubing according to my needs. One



of these I may as well now describe, as it is the one by far the most often used. This I call my current-producer. A piece of soft glass tube is selected, of such a size as to hold firmly when slipped inside the rubber tubing. This is softened in a batwing gas flame and gently drawn to such shape as shown in Fig.

4, A. Next applying the flame edgeways, we again soften locally and get a bend such as is shown in Fig. 4, B. When cool a file scratch at C enables us to part the tube at this point. The orifice at C should be % or 1/8 inch internal diameter. If slightly larger it can easily be contracted by gently heating again at the edge of the flame. This also softens off the rough edges. This simple bit of apparatus is very useful when one wants to quickly

wash a few prints.
Fig. 5 shows how it is used in conjunction with a shallow tray.
The outlet of the tube is arranged so that a fine stream rushes along the side from A toward B, thence out to C



ward B, thence out to C and out at D, as indicated by the curved arrow.

Let me first advise the beginner to

Quick Plate
Washing

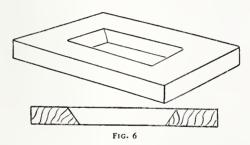
Mashing

Mashing

Mashing

Maccept with caution all such sweeping statements as "deep dishes are always better than shallow ones." For developing, yes. But

for washing under the spray the shallow dish is preferable. In a deep dish the spray affects only the upper layers, while the heavy hypo-laden solution keeps at the bottom all the time, so that the deep tray should be emptied every few minutes. For washing prints in the manner shown in Fig. 5 a shallow tray, as large as the sink will hold, is far better than a deep one. The current-producer there shown acts very well with a round shallow hand-washing basin, or a big pie-dish may serve in an emergency. "Another way," as the cookery books put it, is to put the plate on the top of a strip of wood resting on the sink, and then let a slow gentle stream flow over it. (A strong spray may produce "pitting" of the gelatine). But yet another way, and the quickest way to work a single plate, is to put it film



downward in water. In Fig. 6 is another useful thing which may be made in a few minutes with a chisel and bit of wood. Here we have a bit of deal of mahogany about %-inch thick, and a size or two larger than the plate, say, ½-plate size for ¼-plate negative. Out of the center is cut an opening with sloping sides (see section below). The upper part of the opening is a little longer and wider than the plate; the center opening is a little shorter and narrower. The plate is put in this opening, film down (it cannot slip through), and the wood is then put floating in a bucket of water. It may be argued that this only applies to one plate being worked at a time. True, but the general principle applies in the next washing dodge.

In this case I use one of the usual folding things made of corrugated zinc, Improvement sold with a washing tank or box, but little larger than the plate-holding part. The box is discarded and a large bucket or deep tub used in its place. I have wire loops at the ends of the plate-rack, and a bit of broom-stick goes through these loops and rests on the edge of the bucket. Thus I get a good depth of water below the plates, which are, in this case, held edgewise in the upper part of the water. hypo, dissolving out quickly, flows to the bottom of the tub or bucket. After washing by any method, always rub the film with a tuft of clean cotton wool. This will insure its freedom from much surface dust or gritty matter, which so often disfigures negatives, and shows as streaks or bloom-like patches.

To prevent written labels getting
''smudged,' use water-proof ink when
writing on the paper. Let this dry

very thoroughly. Then coat your label with the following varnish: Cut up into fine shreds an old celluloid negative film, from which you have previously removed all traces of the gelatine coating. Put these shreds in a small bottle. Half-fill with amyl acetate and then add wood alcohol or methylated spirit. The celluloid will become dissolved. Then inside the cork of your bottle fix a trimmed stiff feather, as in Fig. 7. This forms a convenient brush with which to coat the labels. Two or three coatings should be given.

Tubes and Rods

Rods

Mich any handy person can make for himself may now he described. All we need are as follows:

a gas (or spirit lamp) flame, a small three-

a gas (or spirit lamp) name, a sman tines cornered file which need not cost more than a few cents, and some pieces of glass tubing and rods (obtainable at any chemical apparatus store). First learn to cut a tube. Lightly and sharply draw one edge of the file across a bit of tube. You may see that you



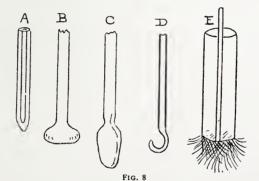
W. S. Ritch



have made a tiny scratch. Now seize the tube with one hand on each side of this crack and pull, rather than bend it apart. One or two trials will quickly show the way. Next bear in mind to slowly heat glass and slowly cool it. Do not thrust the tube straight into the flame, but first warm it a little by holding it a few inches above the flame.

Stirring rods are generally made from solid rod, cut, and the sharp edges rounded off by heating in the flame. But I prefer a bit of small tube with each end closed by drawing out in the flame. A tube is far less likely to smash a delicate glass vessel than is a solid rod if one lets it slip. One end of a closed tube is shown in Fig. 8. A.

Knob-ended rods, however, are very useful at times. If you heat the end of a rod in the flame until it is



quite soft and then press it down upon a bit of metal, such as a knife-blade, or face of a hammer, you get an end something like that shown in Fig. 8, B. Suppose you find a slight fog veil on a negative. Take an ordinary cylinder-shaped graduate. Throw into it a crystal of potassium ferricyanide, add a teaspoonful of water, give the glass a swish and pour off the water. Then with your knob-ended rod crush and grind the red crystal to powder. The wet bottom of the graduate prevents the particles flying about. Then add an

ounce or two of hypo from your hypo jug (see later), and you have a fog reducer at hand in a moment. From the sketch it will be seen that the knob is more conveniently flat, rather than round. This shape is

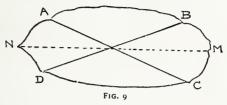
much better for crushing purposes.

A spade-shaped rod end is very useful for loosening the contents of bottles, which have become more or less obstinate, such as often happens with small crystals of soda sulphite, alum, borax, etc. This shape is shown in Fig. 8, C. Soften the end of the rod and then, when quite pliant, seize it suddenly with a pair of flat-ended pliers, or seize between the opposed faces of two domestic flat-irons.

A hook-shaped end is also useful. See Fig. 8, B. First heat and slightly draw out the rod, then curve and cut when cold. We now require a short length of tube, wide enough to admit the hook and a trifle to spare over that. A bit of absorbent cotton is shaped something like a small sausage. It is then caught in the middle by the glass hook and pulled up into the mouth of the tube, as in Fig. 8, D. This forms a very useful brush when it is needed to apply delicate solutions to paper, as, for instance, local toning in platinum or velox printing. It is also useful for local applications of acids and, being entirely of glass, i. e., no metal parts, is not affected by the usual acids.

The usual way of folding and placing Filter a filter paper in a funnel is that best Papers calculated to try the patience of the user. One-half of the funnel is covered by one thickness of paper, the other half by three thicknesses. While exercising patience on this account some time ago. I filled up time by trying various foldings, and so hit on one which gives only one thickness of paper all the way round. As this does not seem generally known, though doubtless it has been discovered by other impatient people, I give it here. See Fig. 9. First bring the point of A of the paper over to its opposite, C, and make the diagonal crease B D. Open out the paper again. Now bring the point B over to D and make the crease A C. Open out again. Turn the paper over and make the crease M N, about midway between

B C and A D. This last crease is, of course, the opposite way to the first two creases. Turn over again and bring the folds M and N toward each other, obtaining a result shown in Fig. 10. This now fills any angle



of funnel and has but one thickness of paper between the contained liquid and the walls of the funnel.

Corks that are kept dry are apt to get hard and lose some of their electricity.

This may, to a great extent, be restored by soaking in warm water. But if one is in a hurry, just wrap up the cork in a bit of clean paper and put it under the foot and roll it about. At first only the most gentle pressure must be used or the cork will break. Corks soaked in hot melted paraffin wax are rendered less porous and so more nearly air-tight. Corks for bottles containing volatile fluids such as alcohol, ether,

etc., should be coated with sealing-wax. Put the cork in the bottle, then warm a bit of good wax and rub on the cork. Now take an old knife, make it warm enough to melt the wax, and with it spread the wax all around that part of the cork which is now outside the bottle. As sealing-wax is soluble in va-

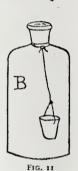
rious fluids, alcohol for instance, care must be taken to keep the fluid from touching the cork. Any vapors of these fluids which may, however, find their way through the pores of the cork, do not seem to have any effect on the wax.

Developer bottles with corks that are in frequent use are apt to jump out of one's fingers (the corks, not the bottles) and then roll to the most inaccessible part of the dark-room floor. It is easy to prevent this. See Fig. 11. Borrow a crochet

hook. Thrust this through the upper part of the cork, as in 11A, then hitch over the hook a bit of string, thin string, pull back the hook and the string with it, and tie the string in a loose loop. The other end of your string is tied around the neck of the bottle, and the lengths are so adiusted that when the cork is out of the bottle and not in your fingers it is hanging to the bottle, and yet not touching the shelf on which the bottle may be standing. This will be explained by a moment's glance at 11B.

This is a handy con-A Filter Stand trivance and easily made. Take a block of wood.

say 6 inches square and an inch thick. Toward one corner bore a hole exactly to fit a



12- or 15-inch length of broomstick. See Fig. 12. In the upper half of the broomstick drive half-way home three or four brass-head nails. at a distance of about 11/2 inches apart. Take a stout piece of copper wire. At one end make a loop large enough to hold the funnel to be used. At the other end make another loop a little larger than the broomstick, i.e., just large enough to pass the heads of the nails. when the loop is horizontal but not in any other position. A glance at the figure

will show that we can readily adjust the height of the holder to suit any bottle or graduate.

FIG. 12



FRESH FROM THE LAND OF NOD W. S. Ritch



HOME PORTRAIT W. S. Ritch

Do not filter when decanting will do as well. Or perhaps you can decant three-fourths or so of a mixture which has been set aside in a bottle for a few hours, and need only filter the last and bottom fourth part. In any case, let the tube of the funnel just touch the inside of the bottle. This will hasten matters a little, and also it is better for the fluid to run down the inside of the bottle in a fine stream than go down by

splashing drops.

When making up developer, dissolve all the ingredients except the active body, i.e., pyro, metol or what not. Filter your mixture and then add the pyro, etc., after filtering. We are not just now going into developing formulæ. But I will venture to quote one very reliable and favorite mixture just by way of example. In a 20-ounce bottle put I ounce of soda sulphite and I ounce of soda carbonate (washing soda, clean transparent crystals) previously crushed fairly small. Add tepid water to the 20-ounce mark on the The crystals will soon dissolve. Now set aside for at least twenty-four hours and preferably two or three days. Very probably a chalky sediment will fall to the bottom. Now decant as much of the clear part as you can, probably four-fifths or so of the lot, and then filter what you could not decant. Wash out the bottle, drain and return the clear solution. Finally add 1 dram (60 grains) of metol. This developer, used just as it now is with a properly timed exposure, brings out a thin "all-over image," i.e., high lights and shadows in about twelve or fifteen seconds after the plate is covered by the fluid, and gives a good negative, fit for platinum printing in about five minutes. When a properly timed exposure no bromide is required with a well-made plate.

A Dropping
Bottle

A dropping bottle can, of course, be made by cutting a couple of nicks down opposite sides of the cork, but the drops are very apt to trickle down the sides of the bottle, and make both it and the shelf it stands on unsightly. Take a bit of rather narrow glass tube.

soften it in the flame and gently bend it and then cut to suitable length and insert into the cork of your bottle, taking care that it goes just a trifle below the

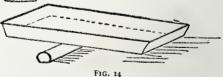
inside surface of the cork. Fig. 13 will make this quite clear. By suitably selecting the size of the glass tube you will find that you can deliver about five separate drops, parting with each with just the suspicion of a slight shake of the hand, without inverting the bottle to let in air. That is to say, with a one-in-ten solution of potass. bromide we can very niently add half a grain of bromide as fast as we can say "one, two, three, four, five."

From dropping Development bottles and devel-Dodges opers we naturally pass to aids to development. One of the most useful and



simplest things is just a strip of wood to put under the middle of the dish as it rests on the table, so that with one finger one can rock a whole-plate dish. quarter- and half-plate an octagonal cedar-wood leadpencil is just the right size and length. For wholeplate, up to 10 x 12, dishes we want a round piece

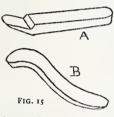
about twelve inches long and say 3/4inch in diameter. With a plane we remove a little of this, so as to make it



rest firmly on the table and not roll about. To make this quite clear I give in Fig. 14 a section of the rod of wood, and below we see this rod resting with its flat side on the table and a developing dish resting on the rod. One need hardly say that the dish must not be allowed to stand with all the developer at one end and part of the plate uncovered, as shown in the figure.

These handy tools should find a place Plate-lifters on every dark-room sink-shelf. We

often enough want to be attending to two or three plates in as many different solutions. One or two plate-lifters enable us to lift the plate up and see how matters are going without contaminating one's fingers with the solution. In Fig. 15 two equally con-



venient forms are shown. That marked A is easily made from the bone handle of a worn-out tooth-brush. All one needs is a file and a little patience. Do not make the likely mistake of making the finger-nail-like end too sharp and thin at its edges, or you will find your plate-lifter become a plate-scratcher. All

sharp edges should be well rounded off with glass paper, or by rubbing on a stone. The above caution, of course, equally applies to form B, Fig. 15. In this case our plate-lifter is of somewhat larger size, and made out of a bit of broken vulcanite tray. A piece was roughly shaped with a saw, then softened by immersing in hot water and bent to shape. When cold it was finished up with a file and glasspaper.

Reading the Graduate graduate more easily seen in the dark-room, proceed as follows: First clean the glass thoroughly, and dry it with equal thoroughness. Now rub into the nicks and cut of the figures some black enamel paint; do not mind over-shooting the mark; set aside to dry. When dry, scrape away with a blunt knife the part not required, leaving the letters and figures well defined.

Dissolving
Hypo
The fixing-baths. The method I have

coolved as being the most convenient to my own needs

is as follows: First buy a glass jug holding not less than 40 ounces (costing about 25 or 30 cents at the crockery and glass stores), measure 10 ounces of water, and put this in your jug. Then on the outside make a mark showing the level of the 10 ounces. For this purpose black enamel paint is just the thing; opposite this line put the figure 10. Add another 10 ounces of water, making 20 ounces in all: again mark the 20-ounce height. and so on up to 30 and 40 ounces. Next take a bit of cane and make a ring about half an inch in diameter larger than the mouth of your jug. Next to your caning fix a bag of fine canvas of the shape shown in Fig. 16, A. This bag must be of such a shape and size that it holds just half a pound of hypo crystals when full level with its top, and when so filled easily goes into the mouth of the jug, the cane rim resting on the mouth of the jug. Tepid water is now slowly poured on the crystals until the water level reaches the 40-ounce mark. By the time this is done the crystals will probably be

most, if not all, dissolved. Tepid water is used because dissolving hypo causes a considerable fall in temperature and a very cold fixingbath acts very slowly. We have now a convenient strength (one in five) for plate - fixing. For prints I prefer to take an equal quantity of this solution and water, vielding a solution of one-in-ten strength.

My next bit of A Carry-all home-made appara-Table tus is known among my friends as my "family fourposter." A glance at Fig. 17 will show at once its very simple nature. It consists of four stout posts of wood about 21/2 inches square and perhaps 41/2 feet long. These form

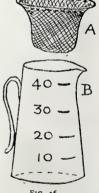


FIG. 16

legs or pillars of a table about 31/2 feet by 3 feet top. Below the top, at convenient distances, I have in my own case put four shelves (three only shown in sketch). The four legs are on casters, for convenience of moving.

I find this a most convenient thing for holding several large trays, or washing dishes, when enlarging. And, as will be seen, it is a great saver of space; for one



does not often find an amateur's dark-room with table space for. say, three dishes to hold 20 x 16 prints. as well as the usual developing and fixing baths. A friend who saw my "four-posadopted and adapted the idea for his own cupboard dark-room, and employs it to hold nearly everything he except what goes on

the small housemaid's sink and small shelf over the sink. The contrivance is useful for drying purposes. All apparatus is removed and a sheet of clean blotting paper put upon each of the shelves, and on the paper is laid the plates or prints to dry where they are reasonably safe from falling dust. When I am preparing for a trip from home all the shelves are cleaned, and then I here collect all the odds and ends which I think I may want when away from home. Other uses will suggest themselves to other workers according to their needs. The top of this table should be prepared or protected as dealt with in an earlier paragraph.

Tray Cupboard

In Fig. 18 is shown another very homely bit of apparatus which has stood under my sink for some years, and holds dishes and trays of all shapes, sorts and sizes. The apparatus was one morning quickly knocked together, using a packing case which had just come to hand. This was done by way of a trial, with the intention of making something more tidy and elaborate. But this rough box has so well filled my wants that I am content to let well enough alone. N. B.—Porcelain and glass dishes should not be stored flat down, one inside or

resting on the other. Experience long ago taught me that this was the most breakable way of doing things. Under my sink I fix a shelf, after the manner shown in Fig. 17. On this shelf stands my fixing-bath for all plates of 10 x 12. This dish-holding-rack just easily goes under the fixing-bath shelf. Thus no room is wasted. The fixing-shelf is large enough for two fixing-baths, side by side. It is, I think, as well to give a plate likely to be of more than momentary interest a second bath. The plate remains in bath No. 1 until all milky appearance is gone, and then goes into bath No. 2 for

about an equal length of time. Bath No. 2 is always kept as clean as possible; and at fairly frequent intervals No. 1 is emptied out and the contents of No. 2 put in No. 1, and a new lot of hypo solution from the jug (Fig. 16) put into tray No. 2.

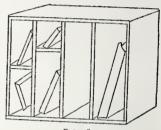
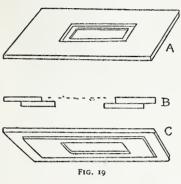


FIG. 18

The experimental photographer very Plate Carriers soon finds that he wants a lot of odd size carriers. For example, he may wish to cut up a half-plate into three equal pieces and use these strips in a half-plate camera. He soon finds that it takes too much time and money to be having these carriers made. Fortunately, it is a very easy matter to make quite efficient carriers out of stiff card for all small sizes, up to whole plates, and of thin wood for large sizes. For example, suppose we wish to make a carrier to hold a 2 x 3 plate in an ordinary half-plate-size holder. First, cut a piece of card the size of the holder. viz., 43/4 x 61/2. Out of its center (found by drawing diagonal lines) cut out an opening just taking easily the 2 x 3 plate. Next cut a second piece of card, 1/4-inch all the way round, less the first, viz., 4 1/4 x 6, and from its center cut an opening just 1/8-inch less all the way round than the plate it is to support. In this case the

plate is 2 x 3 and the opening is, therefore, 1 ½ x 2 ½. With fish-glue we fix these two cards together so that their openings are concentric. The result as seen from



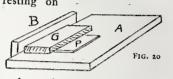
above is shown in Fig. 19, A, and as seen from below is shown in Fig. 19, C, while a section is shown in Fig. 10, B. In the diagrams the reader will rightly surmise that for clearness' sake we have drawn the thickness of the card out of proportion. Naturally, we shall select card of suitable thickness to

agree with the rebate of the plate-holder in which it is to be used, so that the slide will close easily.

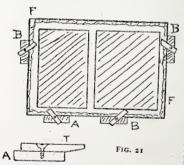
Odd sizes of carriers naturally sug-Cutting Plates gest odd sizes of plates. So I here give my own homely form of plate-cutter for This simple but very useful aid may, for odd sizes. sizes not larger than quarter-plate, conveniently be made out of bits of an old cigar-box. See Fig. 20 (lower diagram). First comes a flat piece of wood, A. To the edge of this is fixed a strip, B. G is the cutting guide made after a few trials, according to one's needs. On A is laid a piece of red blotting or clean The plate to be cut is put film down and one edge of it pushed close up against B, the side stop. The guide, G, is laid on the glass side of the plate and it, in turn, is also pushed close up against B. The diamond runs along the other side of this guide. So far as my own experience goes it seems that one has to allow very slightly less than one-eighth of an inch for the cutting guide size. That is to say, to make a guide giving us a one-inch strip of glass we shall have to make one guide just over seven-eighths of an inch. This, however, had best be found out by trial with each diamond.

I may here give a hint about holding a diamond, which took me some little time to find out and made me surprised at my own stupidity in not seeing it at once. In the upper P part of Fig. 20 is the end of a glazier's diamond resting on

glass. I find that my own diamond gives me a clean cut only when the lower edge of the swiveled end, MN, is parallel to the surface of the glass, PQ.



In my present dark-room I have a Blocking a rather large window, e. g., about 4 feet Window by 6 feet. And as I use the same room for other purposes, I wish to have a daylight-room or dark-room at will. A light wooden framework was made to fit the recess of the window. The frame is very similar to that used for "stretchers" for canvas for oil painting. So that if the reader is not very handy with his fingers, for a quite small cost he can order to be made a canvas stretcher at any shop where artists'



materials are sold. mv case this frame was first covered over with cotton sheeting, folded over the edge and fixed by tacks, as suggested in Fig. 21. The sheeting was then covered by a couple of thicknesses of somewhat thin, yet tough, opaque parcel brown paper.

find this quite opaque to daylight. Two small blocks, A and A, were screwed on the window-frame so that the shutter, as we may now call it, just rested on them. Two other side



FREESIAS W. C. Baker



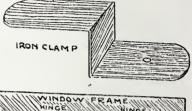
A JAPANESE FANCY Herbert G. French (London Salon, 1902) blocks at B and B kept it in position. To each of the four blocks I put a flat wooden "turn button." In the lower corner of Fig. 21 is shown a diagram section of the turn button and block. It should be noticed that the lower side of the tongue of the turn button is slightly chamfered away. If this is not done, you will find your turn buttons constantly catching and tearing the sheeting or getting jammed with the nails holding down the sheeting.

Another Way A writer in the *Photo-Beacon* suggests a

hinged arrangement, which may be preferred to the plan just given for some purposes. I quote: "When utilizing a bathroom or other apartment as a dark-room, it is easy to fit a frame to the window and screw it to the woodwork, but its disadvantage is that the rest of the family complain of the nether darkness when they wish to use the room. following arrangement will be found to obviate this difficulty; it is easily made and is very effective. Make a frame, from "slate battens," to fit the whole windowframe; strengthen it at the back by two cross-pieces: stretch over it two thicknesses of water-proof brown paper which is quite opaque. On the side of the frame which is to rest against the window-frame paste strips of felt; this will act as a buffer, and exclude all faint rays of light. Now, hinge the top of the frame to the top of the window-frame. By fixing a hook and chain into the ceiling of the room, the frame can be swung out of the way. When in use it should be clamped by three or four clamps to the window-frame; these can be made for a few pence at any hardware They are conveniently shaped, as in the illustration (see Fig. 22). A hole should, of course, be cut in the brown paper, for the insertion of ruby Where the size of the room will permit the hinges are better attached at the side. I find that, by adopting this plan, my bathroom is absolutely lighttight, and that by standing on the edge of a chair and unclamping the frame I can swing it up to the ceiling out of the way, and so let in daylight, which has made my family much more indulgent in photographic matters.

Trapping the light around the door is a very important but quite simple matter. After trials I say "do not try to make a light-tight joint by nailing anything to the edge of the door." Let us have that much ven-

tilation. an d trap your light in a simpler and more efficacious way, as follows: First procure several long strips of stout card, about one inch wide. We now want equal lengths of black or other cloth in strips just twice as wide. Any old garment may be torn up for this purpose. We now take a strip of card and fold over and below it a strip of cloth, obtaining such an arrangement as is shown in the upper part of Fig. 23, C being the card and B the cloth folded over the card.



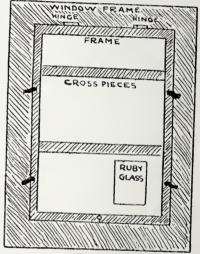
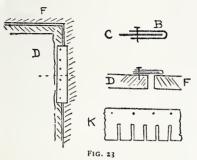


FIG. 22

It is now easy to fix by nailing our stiffened cloth to the door edge, and yet projecting over the junction between the door and its frame. In the left figure we have a portion of D the door, and F the frame, also one short strip of cloth and card fastened to the door edge. At the dotted line we take a section and see the arrangement of matters as in the lower figure to the right. A strip of black cloth, nailed over the lock and hanging



down as a loose flap, will trap any light without inconveniencing the use of lock or door handle.

If light comes in under the door, as in an out-house dark-room, then take a strip of cloth, cut it into fingers and nail along the

outside and inside of the door, so as to touch the floor (see K, Fig. 23, showing the cloth snipped into fingers).

Tourist
Tips

Suppose you are taking a dozen boxes of plates en tour. In that case divide them into two lots of six. Tie up each lot of six into a firm solid block, using a good strong tape. When packing them in a trunk, see that there is some soft garment (stockings or a flannel jersey for choice) between the plate boxes and the outside of your trunk. If taking large plates pack them so that they rest on their edges. They are far less likely to come to grief that way.

After exposure, be careful to put them back in their boxes, film to film. Never put paper with printed matter next the plates. Fold up the wrapping papers as neatly and tightly as you can. Many a good negative has been spoiled by being loosely packed, and so getting its surface rubbed. Be very careful to dust each film as it is being repacked. A very little speck of dust, a bit of wood dust ground up by the sharp edge of the glass, or a bit of glass breaking away from the plate itself, may get on the film and cause irreparable damage. When opening a fresh box of plates, be careful not to get the unexposed and exposed plates mixed. When returning exposed plates to these boxes, write on the box itself the numbers of the plates

corresponding to their numbers in your exposure record or pocket note-book, which of course, you always carry in your pocket when making any exposures. Thus, when you get back home and want to see the result of exposures 34 and 35, you can easily see where these plates may be found without disturbing the contents of the other boxes. Each plate should be numbered, either as it is put in the slide, or on the back after exposure, before it is put back into the box. In case of errors in exposure, it is of great importance to know whether a plate is to be heavily restrained or forced before we begin development, if quite the best results are to be obtained.

If you can find an empty drawer one can often use it as a changing place. The drawer is only partly opened, just far enough to admit one's arms and plate, the changing being done under the further and more protected parts. In this way I have changed plates in a room with street gas opposite the bed-room window and only white blinds, without any changing lamp.

Temporary Trays

Trays

Developing trays may be easily extemporized by folding moderately stiff water-proof or "Willesden" paper, according to the following directions. One or two trials with a bit of ordinary brown paper will teach the trick in a few minutes. Some time ago I suggested a way of folding these paper trays, but that here given is a modified and improved form, giving a tray with much safer sides and stronger corners. This method has not been given before. Once learned, the trick is done in less time than it takes to read these instructions, and the trays will give complete satisfaction.

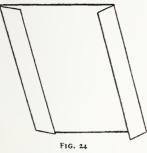
By way of example, suppose we wish to make a tray to hold a 4 x 5 plate. We want a spare margin of two inches all the way round, i. e., a piece of paper 8 x 9 inches, or preferably rather larger to allow for the folds. Let it be understood that Figs. 24-27 are not drawn to scale, but that certain parts are purposely exaggerated

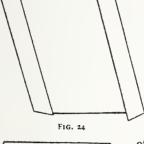
for sake of clearness.

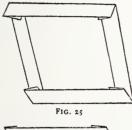
(1) Lay your paper on the table and make an inch fold along each side. See Fig. 24. Flatten all your folds neatly and evenly.

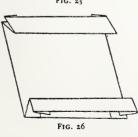
(2) Across the ends make an inch fold, as shown in

Fig. 25.









(3) Turn your folded paper over and across each end: make an inch fold upward, i. e., the opposite way to the last position. See Fig. 26.

(4) Now make an inch fold along each side. again upward. One of these side folds only is shown in Fig. 27.

(5) Now flatten out the fold A just made (Figs. 27 and 28), raise the fold B. Turn over and flatten down the corner

of A as shown at C. Shut down B over C and raise A again, pulling the finger inside the corner behind the lower part of C.

(6) This repeated, of course, at all the four corners gives us the lid with double-thickness sides, all the way round, as shown in Fig. 20.

If water-proof or "Willesden'' cannot be obtained, ordinary stiff, not too thick, brown paper should be soaked in melted paraffin wax. One can nearly always buy a paraffin candle. The soaking may be done in a soup plate. Or, if preferred, you may fold

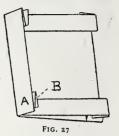
your tray, then cut up your candle into fine shreds, put inside your tray, and place all on a plate in a cool oven. When melted, turn the tray round in all directions and pour away the excess. The tray should not be unfolded for packing. If the two ends be pressed inward and downward, the two sides will spread outward and the whole thing goes quite flat. After use these

paper trays should be emptied as soon as possible and set to

dry, upside down.

McCorkle's Method convenient method for developing plates or making Velox prints en tour is that followed successfully for years by James H. McCorkle. The method is described by him as follows:

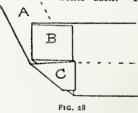
Being away from home much



of the time, I have resorted to many makeshifts to get my developing done. Nearly every room in a hotel can be made into a dark-room at night. A blanket over the window, and focusing cloth, or even your coat over the transom, and you have a dark-room. If supplied with a set basin and running water, your work is easy. I always carry with me a folding candle-lamp and a package of developing powders or tubes. I buy a pound of hypo and am ready for one plate or a dozen.

What about pans? When away from home I develop at least a third of my negatives without any. If you have not the courage to try this, go out and buy two cake tins with square corners, at eight or ten

cents each. These can be used two or



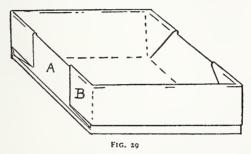
three times, and then left when you move on. Regular trays are expensive and liable to be broken in traveling. In addition to the developer and hypo, I get a small package of absorbent cotton.

Take the goblet in your room and put four

glasses of water into the ice pitcher, and then one-half pound of hypo; stir until dissolved. Fill the glass again (about 8 ounces) and dissolve two developing powders in it. Place a piece of cotton as big as an egg in the hypo and another in the glass of developer, and you

are ready.

In developing by hand, first wet your plate in water thoroughly so that the developer will spread rapidly; having done so, saturate the cotton in the developer, and, beginning at center of plate, circle to the edges rapidly, then go across the plate each way clear to the edges; after you have covered the plate thoroughly wait about a minute, then repeat the operation. Soon the image will appear, and here is where the advantages of this method come in. If one part develops faster than another, hold the plate so that the developer



will drain from that part onto the slower developing portion of the plate, and with the cotton swab the backward part of the plate until it develops up to the density of the more rapid part. If there are any dense parts that still hold back, rest the fleshy part of your palm under such place in the negative, and the warmth of your hand will hasten local development.

Having fully developed the plate, wash it under the tap or in the bowl, then cover it with hypo in the same way, being very careful that the cotton does not press on the emulsion too hard, as by this time the gelatine is somewhat soft and liable to be scratched. A good way is to saturate the cotton in the hypo and squeeze it onto the plate when laid flat on the wash-stand. When the plate is cleared, wash under the tap.

With this method I find no trouble in developing six 6½ x 8½ plates in an hour and a half.

Drying Plates

A cane-bottom chair forms a very handy plate drainer. One corner of a plate is put into one of the holes and the plate rested against any handy object. For example, we may put our camera case on the chair center and range half a dozen quarter-plates round it at night, and

find them all dry in the morning.

Beware of setting plates to dry resting flat on one edge. The water runs down and collects along that edge, forms a dust collector and yields a drying mark. To prevent this, rest the plate on a narrow strip of corrugated packing paper, the plate, of course, crossing the bridges of the paper. Failing that, a couple of wood matches will serve. In case of accident to your traveling lamp, always carry a large sheet of orange paper or Ruby Christia. To extemporize, place one chair upside down on the seat of another chair. Round the inverted legs pin your sheet of orange paper or ruby fabric. Place a short candle inside and put the arrangement as far away from where you are changing as you can. Also interpose your body between the light and the changing table, and so work in comfort and safety.

When going away from home I always carry with me a good-sized piece of red turkey-quill. It forms a useful packing wrapper inside the trunk for the camera, etc., and when changing it has often proved of very great value when one wanted to block out a small window in one's bedroom. A wooden pill box containing a dozen rather long drawing pins or thumb-tacks should be included. By their aid one can fix up a blanket over

a large window.

The dodge most likely to be forgotten is to keep the dark-room in order, a place for everything and everything in its place. This will stave off many troubles and possible disasters. Let your trays, bottles and other conveniences be so kept that, if needs be, you can find things in absolute darkness.

F. C. LAMBERT.

Potes

The photographic season of 1903 has fairly begun, and shows promise of unusual activity. Not for years have the manufacturers displayed so much enterprise or offered so many tempting specialties, all designed to popularize the use of the camera. During the past few weeks, catalogues, booklets and announcements of things divers and sundry have fairly showered upon the editorial desk, and we have enjoyed many hours in a personal examination of the season's novelties. As a natural consequence, our notes this month are appropriately devoted to the manufacturers and their prod-We hope that our readers will find in them some measure of the interest we had in our excursions among the items described. Especially do we urge our readers to get the booklets published by the different manufacturers and all readily obtainable on request. They are full of things profitable to know, and suggest wonderful possibilities of pleasure. And, gentle reader, let us drop a hint: In your dealings with the manufacturers and supply-houses, you can help our work ever so much if you will but remember to mention THE PHOTO-MINIATURE at every available opportunity. It is a small favor, but seems to carry an absurd weight with the manufacturer. Love vibrations, done Roycroftie, will be sent daily during this coming month to all who lend us their aid in this way.

4

A few days ago we had the pleasure of looking over the new cameras and specialties offered by the Rochester Optical Company, Rochester, N. Y., for this new season. These are explained in detail, with a wealth of illustrations, in the Premo and Poco Books published by the manufacturers, but the reader who would have a profit-

able hour should try to see the specialties themselves at the nearest dealer's store. The line is one of the most attractive we have seen in some time, and seems to anticipate every need and desire of the amateur photographer. First among the novelties is the Premo Film Pack, a compact, light-tight device, carrying twelve cut films ready for exposure. The Film Pack is for davlight loading, and, although primarily designed for the new Premo film cameras, may be used in any plate camera with an adapter. In appearance the Premo Film Pack resembles an ordinary plate-holder, being a black cardboard, box-like affair, about five-eighths of an inch thick, and fitting into the back of the camera just like a plate-holder. From the top of the Pack twelve numbered tags project. When the Film Pack is put into the camera and the photographer is ready for his exposure, a pull on tag No. 1 brings the first film into place for exposure. In like manner a pull on tag No. 2 draws the first (exposed film) out of the way, and places film No. 2 ready for exposure. The Film Pack is somewhat difficult to describe, but in operation it is simplicity itself. The films are backed by a strip of black paper, which holds the film in its place, perfectly flat, and in operation this strip, with the film, is drawn under and around a semi-circular piece of metal at the bottom of the Pack. In brief, the Film Pack offers all the advantages of a magazine carrying twelve plates, with all the conveniences peculiar to films, and the added convenience of the daylight loading feature. is without a doubt the simplest, quickest and most practical device for the carrying and exposing of cut films vet introduced.

Another specialty put forward by the Rochester Optical Company, and one which will doubtless win much popularity, is the Premo Daylight Developing Box. This is intended for the development of plates in daylight, extremely compact in its construction and admirably fitted for its purpose. It consists of a neat box containing a transfer-chamber of metal, which accommodates the plate-holder. By withdrawing the slide from the plate-holder, the exposed plate drops into the transfer-chamber. The developing-chamber is con-

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structed to engage the transfer-chamber securely, and the plate now drops into the developing-chamber, where the process of development may be watched through a curtained ruby glass, or development may be followed by the time method. In the same way the hypo or fixing-chamber is attached to the developing-chamber, to which the plate passes after development, and the process of fixing is there completed. The negatives we saw developed in this way were thoroughly satisfactory, and the device offers many advantages to those who carry plates en tour.

We have not yet had an opportunity to give practical test to the new Homocentric Lens, made by Ross, Ltd., and handled in this country by the Rochester Optical Company, but we examined the lens with much interest. It is a symmetrical objective, very compact in form, composed of four elements, and has sufficient space between the anterior and posterior elements for the between-lens shutters now so popular. The collection of prints from negatives made by this lens gave us a very favorable impression of its capacities. We

hope to report upon it in detail later.

Space forbids more than a mere mention of the Rochester Optical Company's other novelties, but a word must be given to the Premo Film Cameras, a special line designed to accommodate the Premo Film Pack, and offered in 31/4 x 41/4 size only. It is made in two styles, one of which somewhat resembles the familiar Cyclone, and retails at \$4; the other is a more pretentious camera, designed for a wider range of work. It is equipped with a Gem Shutter, with a rapid rectilinear lens, and sells at \$10. Unless we are mistaken. this will be one of the most popular cameras of the season. We note that the Snappa Camera, so popular last year, is now made in two styles, one of which has a ground-glass attachment permitting one to focus before exposure, an advantage which speaks for itself. The Snappa is made in 3 1/4 x 4 1/4 size only, and carries twelve plates or twenty-four cut films, which are automatically presented for exposure by means of the wellknown Snappa Magazine. This instrument is particularly adapted for those who prefer small negatives for lantern-slide work or after-enlargement. The Premo Book, giving a complete review of these and other attractive specialties, can be had from most dealers.

With the renewal of his subscription, a reader of THE PHOTO-MINIATURE sends us a very desirable bit of interior work. The photograph, we are told, was made by a gaslight exposure of an hour and a quarter, upon a Carbutt non-halation plate between three and four years old. Considering the illuminant employed, the interior is remarkably good, and offers convincing evidence of the keeping quality of the plate used.

The top notch of hand-camera construction is undoubtedly reached in the new Reversible Back Graflex Camera introduced by the Folmer & Schwing Manufacturing Company, 407 Broome street, New York. This is a single-lens camera on the reflex type, by which the subject can be focused and watched up to the instant of exposure, the pressure of a finger-tip releasing the focusing mirror and making the exposure. Although fitted with every possible improvement known in camera construction, the Graflex is extremely simple in operation and its efficiency is too well known to need comment. It is impossible to describe it satisfactorily in a paragraph, but the camera and the Graphic Focal Plane shutter are fully described in a booklet headed "New Things from the Home of the Graphic Camera," which can be obtained on request from the manufacturers.

The Eastman Kodak Company has announced the new Kodoid Plates mentioned in our last number, and they are now commercially obtainable in this country. Kodoid Plates consist of non-curling, orthochromatic, non-halation, cut films mounted by means of metal clips on black cardboard. Before development Kodoid Plates are handled precisely like glass plates. To de-

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velop, they are removed from their cardboard supports by simply pulling away the clips, and may then be manipulated in the usual way. By a variety of tests we find the Kodoid Plates to be somewhat more rapid than the old Eastman film, and they seem to offer greater latitude in exposure. When this is said their advantages will be apparent to the reader. Those who have sought perfect cut films will do well to give them an early trial. They are obtainable in four sizes, as follows: $3\frac{14}{3} \times 4\frac{14}{3}, 4 \times 5, 4\frac{34}{3} \times 6\frac{12}{2}$ and 5×7 .

We note that the 5 x 7 Kodak Developing Machine is now ready. By the introduction of this, all Kodak film cartridges may now be developed in daylight. The new size is known as Style H, and is for all sizes of film up to and including that used with the No. 5 Cartridge Kodak. Its introduction will, without doubt, still further popularize the use of rollable film this

summer.

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The Prosch Mfg. Company has occupied new and larger quarters at 145-151 West Eighteenth street. New York city. For some seventeen years past this company was located in Broome street, from which factory were sent out some of the most successful photographic shutters and flash-lamps ever known to photographers. The specialties of this company include the original Prosch shutters, the Duplex and later models, the Triplex, Athlete, Triplex Stereoscope, Athlete-Triplex, and the Diaplane shutters, as well as the Lightning, Professional and Proschlite storage flashlamps. An eight-page circular, describing these specialties in detail with illustrations, may be had on application to the manufacturers, and those interested in the evolution of exposure shutters should not miss the information this circular gives.

The Diaplane shutters, new this year, are made in two styles. The first, called "Diaplane I," is especially adapted for hand cameras and for every-day uses; the other is called "Diaplane II," and is intended for the most exacting work that the professional or advanced amateur may be called upon to do. "Diaplane I" has

a speed ranging from time, bulb and slow instantaneous exposures to $2\frac{1}{00}$ of a second, which makes it suitable for the most rapid as well as the slowest work the average amateur may wish to do. This style is made in six sizes, from No. 1 to No. 6, and ranges in price from \$17 to \$22. "Diaplane II" has a range of speed from time, bulb and slow instantaneous exposures to $\frac{1}{600}$ of a second, and is one of the most widely serviceable and simplest shutters ever placed on the market for serious work. It is built upon strong lines for the most severe tests that photographic work in all parts of the world will give it, is obtainable in various sizes from No. 3 for 4×5 cameras and ranges in price from \$25 upward.

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Pins are very little things, but they have many uses in photography. Not always, however, can we find a pin of the right sort, or one that may be used safely for the purpose in hand. Everyone who has pinned down two or three dozen cut films on a board to dry. or tried to hold a strip of developed films flat during drying with pins of the ordinary sort, will appreciate the difficulty. For some time past we have had a great deal of satisfaction in the use of Moore's Push Pins. commonly known as Kodak Push Pins. These are sold in two sizes, in boxes containing twelve pins. The pin itself is practically a steel point of reasonable size, with a very convenient glass handle. The Kodak Push Pin is easily inserted, and as easily withdrawn. For a thousand photographic uses it offers many advantages over drawing pins, ordinary pins, or any other sort of pins, and it can be obtained from most dealers in photographic supplies and stationers.

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Many of our readers have received letters signed "Andrew J. Lloyd & Company, per J. W. C." The J. W. C. is Mr. John W. Collinson, who recently accompanied the senior partner, Mr. Lloyd, on his annual visit to Europe.

One of our readers once said regarding Mr. Collinson:
"You are the only man I know who can answer my

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questions in a way that I can understand; all the others read the catalogues to me." Mr. Collinson owes his unusual practical acquaintance with photographic lenses, shutters, etc. partly to inheritance, for his forebears were skilled optical artisans, and more particularly to the long and arduous training received from his youth upward in the shops of the great opticians,—Ross, Beck, Dallmeyer, Taylor, Taylor & Hobson and others. This training has been of great advantage not only to himself, but to his many correspondents. There are men who know optics on paper; others who can run a machine; but very few who combine so thorough a working knowledge of this subject with a high degree of manual skill.

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The National Specialty Company, 13 West Twenty-seventh Street, New York, is a new concern reaching out for the business of amateur and professional photographers. The scope of the concern embraces the buying, exchanging and selling of high-grade cameras, lenses, and photographic goods generally. Among the specialties listed are a plate-holder to fit any camera, printing frames, negative racks, and a very full line of photographic sundries. Among the side lines are, we notice, pyrographic material and sporting goods. We are acquainted with the managers of this new firm and cordially recommend their facilities to our readers. Price lists can be had on request.

4

Among the most interesting of the trade catalogues received during the month, the Century Camera Company's catalogue deserves prominent mention. The products of the Century Camera Company, Rochester, N. Y., have for years enjoyed a high reputation among those best fitted to appreciate quality in camera construction. The officers of this concern are experts in the business, and, as a consequence, the Century cameras impress one first of all by their excellence of construction. All the models we have seen have rising and falling fronts, devised so as to permit the

maximum amount of movement, which in some styles is controlled by a milled head, giving perfect adjustment. The rack and pinion movement is fitted with a patent automatic lock, which securely holds the lens in any desired position. In other models the front moves horizontally as well as vertically. The Automatic Front Clamp is fitted to all Century cameras. its name implies, automatically clamps and holds the front of the camera (with the lens and shutter) at any desired point on the bed, a novel device which deserves much praise. With this clamp there is absolutely no chance of the camera front slipping after the focus has been adjusted. To release the clamp one simply turns the handle back a little over to the right or left, when the front of the camera may be moved forward or back. As soon as the button is released the clamp operates automatically and the front can neither slip nor slide. An equally desirable feature peculiar to Century cameras is the adjustable focusing screen, which not only provides for variations in the thickness of the ground-glass, but permits one to replace a broken screen in two or three seconds, with the surety that no matter how thick or thin the new screen be, it will register at and occupy the same plane as the sensitive plate. We mention these points in detail to attract the attention of the reader to that carefulness of construction which marks the products of the Century Camera Company.

The many other specialties put forward by this interesting firm are very attractively described in the Century Book, which readers can obtain from dealers on application. We must not overlook, however, the McCorkle Needle-Hole Attachment, which is the latest introduction of this firm. This Needle-Hole Attachment has already been fully described in an earlier number of THE PHOTO-MINIATURE, and we have presented examples of work done with it by its inventor, Mr. James H. McCorkle; but doubtless many readers would prefer to buy the little instrument in the perfect form offered by the Century Camera Company. The model attachment received is exceedingly neat and attractive in its construction, while at the same time

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possessing the desirable lightness and rigidity. Considering the difficulties of obtaining a perfect pinhole, this little instrument, which is bored with needle-holes No. 10, 11 and 12, and a separate focusing aperture, is very reasonable in price. It is fully described and illustrated in a special booklet, which may be had on request from the manufacturers.

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In sending us a copy of their new catalogue of Cooke Lenses, Taylor, Taylor & Hobson, Ltd., advise us that they have equipped their New York office, in the St. James Building, with a Test Camera especially designed to facilitate the critical examination of photographic lenses of all kinds. Visitors to New York will doubtless be glad to avail themselves of this opportunity to compare the results given by different lenses, as well as to test the capacities of their own instruments. We spent a little time recently with this Test Camera, and hope to describe it more fully in our next number.

The new catalogue mentioned is a very dainty piece of bookmaking, and offers much useful information about lenses, apart from its description of the various specialties manufactured by Taylor, Taylor & Hobson, Ltd. It also includes a set of test diagrams, by which the photographer may roughly estimate the quality of his lenses in various particulars. A copy of the catalogue can be had on request from Messrs. Taylor, Taylor & Hobson, Ltd., and those interested in photographic optics will do well to avail themselves of the

opportunity.

The 1903 Kodak Catalogue, with a gaily decorated cover in several colors, comes to hand as these pages go to press. It is a substantial book of seventy-two pages, gotten up in the desirable style peculiar to everything emanating from the Kodak Press, Rochester, N. Y. The foreword deals with the abolition of the dark-room by the kodak triumvirate, to wit: the daylight loading film cartridge, the Kodak Developing Machine, and

daylight development papers. The Kodak system is

very clearly explained, with many illustrations, and all the Kodaks, both new and old, are described in detail. We have barely more than glanced through the book, but we note that a very clever little shutter makes its first appearance in these pages, adapted for use on the new Folding Pocket Kodak No. 3A. This shutter is especially adjusted to utilize the full intensity of the lens with which it is equipped, and has diaphragm stops, with a graduated scale. It is of the ever-set type, a single pressure of the bulb or finger release giving an exposure of one-fiftieth of a second. It is also equipped for bulb and time exposures. The Folding Pocket Kodak No. 3A, like the others of its class, is extremely compact in construction, and may be carried in a top coat-pocket. Its peculiarity lies in the size and shape of the pictures which it makes: viz., 31/4 x51/2. size will commend itself to pictorial workers as peculiarly desirable for certain compositions, for panoramic effects and figure work. The camera measures 1 1/8 x 4 3/4 x 9 1/2, and is made of aluminum covered with seal leather. By the use of an adapter the No. 3A F.P.K. may be used with glass plates 31/4 x 41/4. It is equipped with a rapid rectilinear lens, focal length 6½ inches, covering the plate to the edges at the full aperture of F8. It will thus be seen that the new camera covers a wide range of photographic work, and this, with its reasonable price, will doubtless secure for it a big measure of favor. Copies of the Kodak catalogue can be obtained from most dealers for the asking.

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The yearly catalogues published by Hirsch & Kaiser, of 7 Kearny street, San Francisco, are always notable for their compactness, fullness of information and careful compilation. The catalogue for 1903, just received, forms a very desirable reference book for those desiring information as to the new specialties of this year. The catalogue runs to almost one hundred pages of ample size, and in text and illustration gives interesting details covering the every-day and every-other-day wants of the photographer. Copies can be obtained on request.

NOTES 47

Among the qualities possessed by lenses which elude the understanding of the average amateur, flatness of field, astigmatism, intensity, and depth of focus are notable. These are explained in every text-book on optics, but for a familiar and profitable heart-to-heart talk about them, we commend our readers to the little booklet "What Taylor Taught Me," just issued for free distribution by the Voigtlaender Optical Company, 133 West Twenty-third street, New York. This little booklet has been prepared with much art and artfulness. It is well worth the postal card which will bring it to any address.

From the Gundlach-Manhattan Optical Company, Rochester, N. Y., we have received a copy of their 1903 catalogue, describing, with many illustrations, the fifteen styles of the Korona cameras and going very fully into details of construction. The Turner-Reich anastigmat and the Verastigmat, together with the popular Rapid Rectigraphic and Perigraphic lenses, are also listed, with the other specialties manufactured by this enterprising firm. The illustrations accompanying the descriptive text include may fine specimens of photography, and at the same time display the qualities of the lenses described. A copy of this catalogue can be had from the Gundlach-Manhattan Optical Company.

....

During the last few years there has been a growing demand for hand cameras especially designed for "movement photography" or rapid instantaneous work, such as the photographing of fast horses, automobiles and express trains. The latest instrument of this class is the Speedway Camera, described in a booklet received from G. Gennert, 24 East Thirteenth street, New York. Judging by the model shown us, the Speedway Camera combines compactness and beauty of finish with practical usefulness. It is fitted with the famous Collinear lens, a focal plane shutter capable of exposures ranging up to one one-thousandth of a second, and has a novel method of focusing by means of a lever on the lens

jacket, and also in rapid work, by a focusing scale. The finder attached to the Speedway Camera is fixed on the top of the camera to be looked through, an obvious advantage. It is fitted with three plate-holders having metal corners and rubber slides, or a plate-changing box can be used. All these points, with much other information, are given in the booklet to which our readers are referred.

We have received from the John Carbutt Dry Plate and Film Company, Wayne Junction, Philadelphia, a reproduction of a painting made on the Polychromatic plate, with the new Carbutt greenish yellow screen, which cleverly demonstrates the practical value of this plate in the reproduction of color. With the screen mentioned the exposure is very much shortened and at the same time full color values are assured. Those interested should apply to the manufacturers of the Polychromatic plate for a sample print and particulars.

Among the difficulties which beset the path of the novice in photography, not a few are directly traceable to the delusion that he must always use a plate of extreme rapidity. For many subjects encountered in every-day work a plate of medium rapidity will give the results desired with more ease in manipulation, such as latitude of exposure and development, and with infinitely fewer chances of failure. We experienced new proof of this recently in outdoor work, for which Forbes Landscape Plates of medium rapidity were employed with complete satisfaction. Our negatives of trees showed no trace of movement and gave a richness of gradation in the prints often lacking in negatives made on plates of ultra speed. The Forbes plate is manufactured by one of our oldest dry-plate makers, Mr. V. Forbes, of Rochester, N. Y., whose products have long been esteemed by critical picture makers.

Tennant and Ward's List of New Books and publications

PHOTOGRAMS OF THE YEAR 1902. A Pictorial and Literary Record of the Artistic Photographic Work of the Year. Compiled by the Editors of *The Photogram*. (8th volume of the series.) The only annual record of its kind. 200 pp.; 200 illustrations. Paper, \$1. Library edition, \$1.25, postfree. Send for detailed prospectus.

AMERICAN PICTORIAL PHOTOGRAPHY. Representative examples of the work of the American School of Pictorial Photography. Selected by and reproduced in photogravure under the personal supervision of Alfred Stieglitz, and formerly published by "Camera Notes." Series I, net, \$15. Series II, net, \$8. The edition was limited to 150 copies of each series, and only a few sets are obtainable. Descriptive circular on request.

THE "CAMERA NOTES" IMPROVED GLYCE-RINE PROCESS for the development of platinum prints, including the experiments of Alfred Stieglitz and Joseph T. Keiley. Illustrated with facsimile reproductions in color, by the experimenters. Reprinted from "Camera Notes." Only a few copies obtainable. Paper covers, net, \$1.

AN INDEX OF STANDARD PHOTOGRAMS. Being a guide for Authors, Editors and Publishers of Illustrated Books and Periodicals, Collectors of Pictures, etc., listing photographs available for publication purposes. Sold by subscription only. Particulars on request.

PHOTOGRAPHY FOR NATURALISTS. By Douglas English. A book for those interested in photographing animals, etc. 132 pp., fully illustrated. \$2.50.

PRACTICAL NOTES ON TELEPHOTOGRAPHY. By BECK LTD. A pocket-book of practical information. Cloth, 25 cents.

THE A B C OF PHOTO-MICROGRAPHY. A practical handbook for beginners, by W. H. WALMSEY. With plain instructions and many engravings. 155 pp.; 28 illustrations. Cloth, net, \$1.25.

PHOTOGRAPHIC APPARATUS, its making and repairing, by various English writers. 128 pp.; many diagrams. Cloth, net, \$1.

FINISHING THE NEGATIVE. An encyclopedic treatise on all the processes between development and printing. Edited by George E. Brown. 160 pp.; profusely illustrated. Cloth, net, \$1.25.

THE LENS. A practical guide to the choice, use and testing of photographic objectives. By George E. Brown and Thomas Bolas. Profusely illustrated. 176 pp. Cloth, net, \$1.25.

Descriptive Circulars and Book-List on Request

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Valuable in Portrait Photography

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View Cameras, all grades.

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Every surface in a lens will reflect a certain portion of the light which falls upon it. This reflected light not only represents a loss of speed, but it also finds its way into the camera, where it often causes false images, or "ghosts" on the ground glass.

Many lenses consist of three, four or more glasses separately mounted in a lens mount.

Jagllorder & Sci.

Such lenses have numerous reflecting surfaces, but what is more, the proper adjustment of the glasses one to the other is apt to suffer, to the detriment of the optical qualities of the instrument.

CAREFUL BUYERS WILL CHOOSE
A LENS WITHOUT AIR SPACES

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have their glasses firmly bound in correct positions, have no reflecting air spaces, have finest definition, depth of focus, brilliancy, covering power, and

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This is our very latest, a beauty; medallion style of pattern, linen finish, double extra heavy stock, matched edges; colors, Jet-black, Olive-brown, Venetian Brown, Cream-white and Ivory.

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A very low-priced staple card, made of best grade of card stock; looks like a card costing double the price; colors, Olivebrown and Gray.

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Matched edges; colors, Olive-brown and Ascot White, hand-finish surface; white tissue covers to match card, and seal embossed on cover, with silk ribbon.

An ad. never "can tell the whole truth." Send ten two-cent stamps and we will send you a set of these styles by mail, and you can see for yourself.

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Our Catalogue will give you full information of French Satin, Jr.; also our Chromium Fixing Salt, Normal Developer in powder and liquid form, Combined Toning and Fixing Solution and Powder, and our other specialties. Write for it.

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ROCHESTER, N. Y.

Eastman's Kodoid Plates

AN ECONOMICAL AND PRACTICAL SUBSTITUTE FOR GLASS PLATES. NO KITS REQUIRED. USED IN ANY PLATE-HOLDER. ORTHOCHROMATIC AND NON-HALATION.

If one should draw up a list of the desirable qualities in a perfect substitute for glass plates, what would these qualities be?

It seems to us that the requirements called for would be about like this: A substitute that could be used in ordinary plate-holders without "inside kits."

A substitute that would lie flat.

A substitute that would not break.

A substitute equal in speed and in latitude to the very best plates.

A substitute that is much lighter than plates.

A substitute that is not high in price.

Kodoid Plates have all these qualities—and more. They are both orthochromatic and non-halation.

On "yellow days" their qualities are most to be appreciated. Being highly sensitive to yellow, they give well-timed negatives under conditions where the ordinary plate would prove anything but satisfactory. Used in connection with a speedy lens they make snap-shots possible almost every day in the year. In bright, clear sunlight they work like a fast plate. When the light is discolored the orthochromatic qualities tell, and they remain speedy where the ordinary plate seems slow. For cloud effects, for winter landscape work, for home portraiture, for every phase of pictorial work where non-halation and orthochromatic qualities and wide latitude are an advantage, they are decidedly preferable to glass plates.

They consist of a light film attached at the edges to a black card support by means of metal retaining clips, and can be used in ordinary plate-holders in precisely the same manner as glass plates, without any preparation whatever. After exposure they are removed from the support, as shown in the

ROCHESTER, N. Y.

illustration, an operation requiring but a few seconds, and are then developed and fixed in the same manner as glass plates. As they lie flat, no glycerine bath is required.

They are second only to film cartridges in lightness and convenience. They will appeal to the plate camerist because of the saving in weight, because they will not break, because they are easily stored, and because of their magnificent chemical quality—all of which he can get without the outlay of a single penny in new extras or apparatus.



Removing the Metal Clips

Kodoid Plates (under the name "Pelloid") were introduced in the English market some five months ago and met with immediate and unqualified success. In this country they have been tested and approved by a number of leading photographic workers. Their quality and convenience will certainly appeal at once to the progressive photographer.

Kodoid Plates may now be obtained from all Kodak dealers.

KODOID PLATE PRICE LIST

31/4	x 4¼, 1	per doz.,								•					\$0	45
4	x 5,	• • •				٠	•	•	٠	٠	٠	٠	٠	•		65
43/4	$\begin{array}{c} x & 5, \\ x & 6\frac{1}{2}, \end{array}$														T	00
5	x 7,														I	10

OVERCOME DRAWBACKS

BRITISH JOURNAL OF PHOTOGRAPHY COMMENTS ON KODOID PLATES

Hitherto one of the drawbacks to the general use of cut films has been the difficulty of providing sheaths, holders, or backing pieces which should be suitable for the ordinary dark slide and not cause trouble to a person chronically indisposed to take trouble—the amateur photographer. Pelloid [now Kodoid] films step in to remedy this omission. Clipped to the card on all four sides, they handle, as it is claimed, as easily as a glass plate, from the moment they are taken from the package until after exposure. The thin clips are readily removed and development proceeds as usual. Qualitatively the film appears excellent.

ROCHESTER, N. Y.

PHOTOGRAPHIC COMPETITIONS

For the benefit of those interested, we will give here, each month, a bulletin of the important photographic contests in pragress throughout the United States.

BAUSCH AND LOMB OPTICAL COMPANY, Rochester, N. Y. International

competition. \$3,000 in prizes. Closes October, 1903.

C. P. Goerz Optical Works, 52 Union Square, E., New York. Cup competition for professionals. Closes August 1, 1903.

International Competition. \$1,500 cash prizes. Closes June 30, 1903.

Leslie's Weekly, 110 Fifth Avenue, New York. Weekly competitions, open to amateurs. Prizes, \$10, \$5, \$1.

BUFFALO EXPRESS, Buffalo, N. Y. Continuous contest. Prizes, \$5 to

\$25 weekly.

LADIES' HOME JOURNAL, Philadelphia. Pictures of rooms or churches decorated for weddings. 10 prizes aggregating \$200. Contest closes July 1, 1903.

LADIES' HOME JOURNAL, Philadelphia. Pictures of church interiors decorated for Easter. Prizes, \$50, \$25, \$10, \$10, \$5. Closes April 25, 1903.

FILM GAINS

NOW BETTER THAN PLATES AND GROWING IN FAVOR EVERY YEAR

There may have been a time when plates were better than films. There came a time when films were as good as plates—there is a time when films are better than plates.

It takes patience and years to overcome prejudice. But it can be overcome. The steady increase in the use of Kodak Films, not only among tourists and the general public, but among the most earnest photographic workers, shows that the prejudice in favor of plates is being overcome very rapidly.

EASTMAN'S SPECIAL DEVELOPER POWDERS

Sold only in hermetically sealed glass tubes

Best for Films and Plates

25 cents per pkg. of 5 tubes. All Dealers

ROCHESTER, N. Y.

The movement toward films was slow at first, but each year it gains in impetus. Many prize-winners, salon exhibitors and earnest photographic devotees are using film. Its chemical quality and its convenience appeal to them. Mr. Thos. A. Morgan, President of the Denver Camera Club, whose standing is high among amateurs, has this to say of Kodak films:

BEST PICTURES ON FILM

Denver, Colo., Feb. 11, 1903.

EASTMAN KODAK COMPANY, Rochester, N. Y.

* * * By the way, "Out of the Mists," 3 ½ x 3 ½ enlarged to 8 x 10, and which got eighth prize in the enlargement class in your recent competiion, got a great send-off in the Chicago Salon. It is now in the Minneapolis Salon. It has also taken the \$50.00 medal in "Outdoor Life." My best pictures, in fact all of my salon pictures, with one exception, I have secured with 3½ x 4¼ and 3½ x 3½ Kodaks. Yours truly,

THOS. A. MORGAN.

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As simple to handle as "Blue Print"

Beautiful in tone and surface

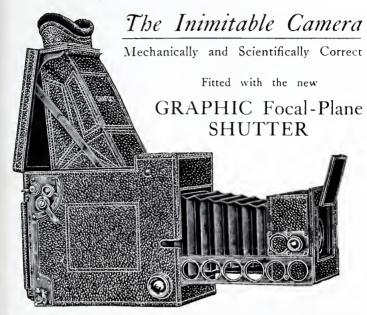
In sealed tubes

2	doz.	$3\frac{1}{4}$ x	$4\frac{1}{4}$	09	-	-	 15	cents
2	doz.	4 x 5	-		~	-	 20	6.6
1	doz.	5 x 7	nor	-	top.	_	 20	6.6

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ECLIPSE—An extremely rapid plate for instantaneous exposures.

ORTHOCHROMATIC—Made in sensitometers 23, 25 and 27.

POLYCHROMATIC—Sensitive to the whole range of the spectrum.

A TRANSPARENCY-Plain and ground glass.

B 16—A slow plate for copying and landscape and architectural work.

PROCESS—For intense, clear lined negatives.

OPAL-Plain and ground.

LANTERN SLIDE—Coated on selected crystal glass.

STRIPPING—Easy to manipulate.

NON-HALATION—Double-coated.

NON-HALATION-Backed. Single heavy coating.

THE CARBUTT DRY PLATE & FILM CO.

Wayne Junction, Philadelphia, Pa.

Price-list and descriptive circulars mailed on request

NOTES AND COMMENTS

A very notable creation, which is worthy of the attention of all photographers who keep abreast of the times, is the new Premo Film Pack, daylight loading. This is a compact, light-tight device, carrying twelve films ready for exposure. It is for use in the new Premo Film Cameras, or in any plate camera with an adapter. It fits into a plate camera just as a plate-holder The simplicity of the device, as well as its ease of operation, must appeal to every one, for it brings to the possessor of a plate camera all the advantages of his superior equipment with the convenience attending the daylight loading film feature. No less an authority than F. Dundas Todd, in commenting on the new device, says: "By its use the photographer is able to load and unload his camera in daylight, focusing each exposure if desired, and at the same time to be free of the weight of glass plates, which every one knows is a great advantage when touring." The Premo Film Pack is loaded with the film made especially for it by the Eastman Kodak Company of Rochester, New York. Whether the Film Pack is used with a plate camera or with a Premo Film Camera. the operation of loading and presenting successive films for exposure is the simplest, quickest and most convenient ever devised.

The attention of the amateur and the professional has been focused upon the new Premo Daylight Developer, by which dry plates that have been exposed may be developed and fixed in daylight with perfect safety and most admirable results. This outfit, which is extremely compact, consists of a transfer box, which accommodates the plate-holder, a developing chamber and a hypo chamber. After the plate-holder is placed in the transfer box and the slide withdrawn, the exposed plate drops from the holder. The developing chamber is constructed so as to engage this transfer chamber securely, and the plate passes down through the developing chamber, where the process of development goes on and may be observed through a curtained ruby glass. In the

NOTES AND COMMENTS

ing chamber and the process continued. The machine may be used with perfect comfort and safety in any apartment and the results are most satisfactory. The apparatus is all included in a handsome hardwood case.

The Homocentric Lens, which was announced early in the year by Ross, Ltd., London, has reached this country and has been accorded a most cordial reception by the experts. The word Homocentric itself signifies a lens of ideal definition, and the new lens certainly possesses definition to a degree heretofore unattained. In construction the Homocentric lens is symmetrical, being composed of four single meniscus lenses with sufficient space for between-lens shutters. It is made in a series of different relative apertures to suit various purposes. The Rochester Optical and Camera Company, who are the American trade agents for Ross, Ltd., have issued a special lens catalogue descriptive of the product.

While there can be no question as to the value of special plates for special purposes, nevertheless the great popularity of a plate of general utility is attested by the marked success of R. O. C., the Rochester Dry Plate. This product has been on the market scarcely a year, but in point of quantity sold and the satisfaction given it ranks with leading plates. It is a plate that may be used by the amateur and the professional with a degree of perfect surety under all conditions. Photographers of every stage of proficiency who wish to profit by the most important advance in the art should make a trial of this plate.

The complaint is often made that camera and lens catalogues fail to give the information essential to an intelligent choice among the specialties described. This complaint cannot be applied to the 1903 Premo Cata-

NOTES AND COMMENTS

logue, just out. In this dainty brochure of 48 pages, the new cameras are comprehensively described in so simple and interesting a way that the advantages peculiar to each individual style are readily perceived. It is difficult, in fact, to see wherein the Premo Catalogue could be improved, either as a guide to buyers, or as a choice bit of bookmaking. Copies can be had from all dealers.

The famous Snappa Magazine Camera is now obtainable with a ground-glass attachment permitting one to focus the subject before exposure. This improvement will be generally appreciated as completing what is conceded to be one of the most satisfactory of folding hand-cameras. It is obtainable in one size only, for twelve plates or twenty-four cut films $3\frac{14}{3} \times 4\frac{14}{3}$, and is designed for the making of negatives for enlargement, lantern slides or tourists' memoranda.

The Pocket Premo is the latest addition to the famous Premo series and is, without a doubt, the most perfect pocket photographic instrument yet offered to travelers and the public generally. It measures only 2½ x 3¾ x 5 inches and is equipped with the Plantograph lens and Auto shutter. If desired, it can be fitted with the Ross Homocentric which works at F 6.3, and, so equipped, this dainty box is adapted to the severest requirements of the camerist. With the Pocket Premo one can use plates or cut films at will by means of the Premo Film Pack Adapter. Thus this instrument is not only a daylight-loading film camera, carrying twelve exposures, but at the same time it is a perfect pocket plate camera.

ALBUMA

MATCHLESS in brilliancy and gloss

"It has a quality all its own"

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EASTMAN KODAK CO.

ROCHESTER, N. Y.

FORMERLY NEPERA PARK, N. Y.

The proof of KLORO is in the printing

It's the best of glossy papers.

Insoluble emulsion—heavy imported stock. Easy to handle—pleasing in effect.

Sold by all stock dealers

THE PHOTO-MATERIALS CO. Rochester, N. Y.

Bausch & Lomb PLASTIGMAT F/6.8

The Perfect Photo Lens

Plastigmat f/6.8 represents the latest and highest achievements of the optician's art. It was designed with all the requirements of photography—pictorial, mechanical and optical—in view, and it meets the requirements.

It is a symmetrical anastigmat of longer focus than those heretofore produced, giving superior pictorial effect. It can be fitted to any camera and takes any shutter between its combinations. The anastigmatic and other corrections are perfect, and its speed is all that is required.

The single combinations are free from astigmatism and give pictures twice the size at same distance, or same size at twice the distance, at snapshot speed.

There is no symmetrical anastigmat equal to it

SPECIMEN PICTURES ON REQUEST

BAUSCH & LOMB OPTICAL CO.

NEW YORK: ROCHESTER, N.Y.: CHICAGO

Manufacturers of the World-Famous

BAUSCH & LOMB ZEISS ANASTIGMAT LENSES

in Seven Series

Catalogue Free



METOL QUINOL DEVELOPER

IN GLASS TUBES

For Velox and other developing papers. Also plates and films. It is perfectly balanced to give density and detail in harmonious proportions

PRINTS DEVELOPED WITH IT ARE PERFECT IN TONE AND RICH IN DETAIL

By Far the Best Developer on the Market

PRICE PER BOX CONTAINING SIX TUBES, 50 CENTS

THE IDEAL PHOTO OPTICAL OUTFIT

This outfit consists of one each of the following lenses: PORTRAIT, ENLARGING AND COPYING, WIDE ANGLE and TELPHOTO. Also one IDEAL RAY FILTER and one Duplicator. This outfit multiplies the value of a cam-



era six times. The lenses are corrected and of the highest grade. Send for pamphlet and directions for use. Price of outfit, complete, for any size hand camera, \$6.00. The lenses can be purchased separately.

MICROGEN

THE MOST FLEXIBLE DEVELOPING AGENT

Microgen-developed negatives are brilliant and superb printers. Microgen-devoloped prints on developing papers show the finest details and the richest tones. Price per 1-ounce bottle, 50 cents.

Ask your dealer for INTENSINE, a Mercuric Iodide Intensifier. Price per tube, 20 cents

We manufacture over 200 Photographic Specialties. For sale at the dealers'. Ask for our brand

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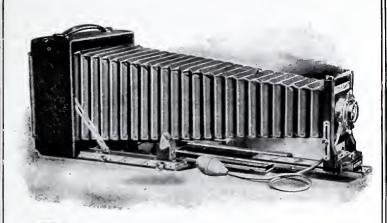
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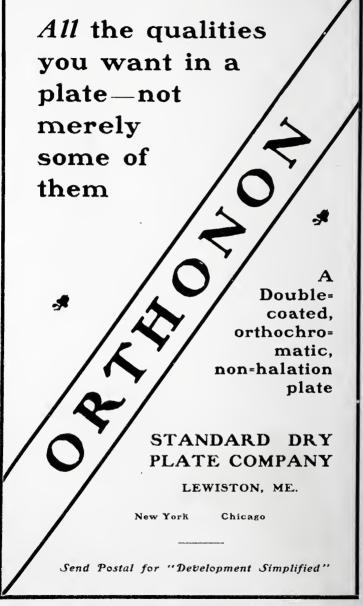
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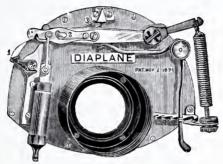
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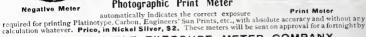


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